IMPERIAL BUREAU OF ANIMAL HEALTH

THE

VETERINARY BULLETIN

Vol. 3.] August, 1933. [No. 8.

DISEASES CAUSED BY BACTERIA AND FUNGI.

PINNER, M., & VOLDRICH, M. (1932). **Derivation of Staphylococcus albus, citreus, and roseus from Staphylococcus aureus.**—*J. Infect. Dis.* **50.** 185-202. 3 tables. [27 refs.]

Staphylococcus albus, *S. citreus* and *S. roseus* can evolve from pure *S. aureus* if the latter organism is grown in media containing *S. aureus* antisera. This mutation appears to be very stable, but it is possible to cause *S. albus* so obtained to revert to *S. aureus*, if the organism is grown for some time in undiluted anti-*albus* serum. The *aureus-albus* relationship is comparable to the S-R colony formation of other micro-organisms.—NORMAN HOLE.

SOULE, M. H. (1932). **Identity of *Bacillus subtilis*, Cohn 1872.**—*J. Infect. Dis.* **51.** 191-215. 4 figs., 2 tables. [40 refs.]

It has been suggested to the Committee on Nomenclature of the International Society of Microbiology that the *B. subtilis* as described by Cohn in 1872 be accepted as the type species of bacillus. In the absence of a subculture of one of the strains identified as *B. subtilis* by Cohn, the author suggests that the existing Michigan strain originating in Koch's laboratory in 1888 should be recognized as the type species.—A. J. WILSDON.

FELDMAN, W. H. (1932). **Observations on the Longevity of Mycobacterium tuberculosis of Bovine Origin.**—*J. Amer. Vet. Med. Ass.* **81.** 223-229. 1 table. [13 refs.]

Emulsified suspensions of 21 samples of lymphatic glands and one of lung tissue from tuberculous cattle were prepared in sterile physiological saline. A proportion of each suspension was used for cultural and animal tests and it was shown that all the samples contained living tubercle bacilli; 16 of them were positive by cultural tests and all by guinea pig inoculation. The remainder of each sample was preserved in a refrigerator, the temperature of which varied from 5° to 10°C. Eight of the suspensions were shown to possess viable *M. tuberculosis* in sufficient numbers to incite definite lesions of tuberculosis in guinea pigs after being in the refrigerator for periods varying from 310 to 345 days. Of four suspensions that remained in the refrigerator for 418 to 422 days, only one induced lesions in the test animals. Of six samples tested after 435 to 446 days, none induced tuberculosis in the test guinea pigs, whilst two of the four which remained for 450 to 451 days contained viable and pathogenic forms of *M. tuberculosis*. The author comments on the variability observed.—R. LOVELL.

COBBETT, L. (1932). **The Rabbit as a Means of distinguishing the Human from the Bovine Type of Tubercle Bacillus : the Lesions caused in the Rabbit by Tubercle Bacilli of the Human Type.**—*J. Path. & Bact.* **35.** 681-699. 11 figs. on 5 plates. [10 refs.]

Although calves or goats may give clearer results when the type of mammalian tubercle bacillus is to be determined, the rabbit is frequently used because it is cheap to buy and house and free from spontaneous tuberculosis. The author draws attention to the fact that the rabbit is only relatively immune to infection with the human type and points out, from his experiences, that tubercle bacilli of the human type are irritating to the tissues of the rabbit and when injected into the peritoneal cavity of that animal they become massed, attract wandering cells and numbers of caseous abscesses develop. This may be regarded as the normal product of human tubercle bacilli in such a site in the rabbit. There is, however, often some degree of generalization evident in the lungs. This type of disease is transient, reaching its climax in the third to fourth week after which it tends to subside. Death at this point is rare. The lesions tend to disappear though some amount of chronic disease may be found later. In rabbits killed or dead during the first few weeks after intraperitoneal inoculation of human tubercle bacilli, one must expect to find this mild type of peritonitis and even some degree of miliary tuberculosis of the lungs, although the infection is different from that with severe advanced peritonitis, massive caseous lung lesions and kidney lesions seen in rabbits which have died from a similar injection of the bovine type. On the other hand, exceptional instances of severity of lesions occurring in the testes, joints and sometimes lungs of rabbits, which had been infected with the human type and had been allowed to live many months, are cited. The author, however, points out that when one wishes to determine the virulence of a strain for rabbits, it is usual to inject two or more animals, as this eliminates the danger of being misled by an exceptionally susceptible individual rabbit. Such certainty can only be arrived at by the use of several animals.—R. LOVELL.

GARDNER, L. U. (1932). **The History of the R1 Strain of Tubercle Bacillus.**—*Amer. Rev. Tuberc.* **25.** 577-590. [18 refs.]

An attenuated strain of tubercle bacillus known in the Saranac Laboratory, New York, as R1 is apparently extensively used because of its comparative avirulence. The original culture was isolated in 1891 from the lung of a human being dying of miliary tuberculosis. The first subculture obtained from its passage through a rabbit was named R1 and all subsequent transplants are known as R1.

It has been shown that three or four years artificial cultivation reduced its virulence to a low level, but that thereafter it has maintained a very definite though possibly variable degree of parasitism over a period of 35 years. At the present time the injection of moderate doses into guinea pigs results in the formation of caseous tubercles which tend to heal and may ultimately disappear. Death from generalized tuberculosis is exceedingly rare, as a self-limited healing tuberculosis is produced more or less comparable to those human cases where the infection shows no tendency to progress.

The history of its virulence for various species of animals is unusual. For the first year or so it was pathogenic for both rabbits and guinea pigs, later it failed to kill rabbits and produced only chronic lesions in guinea pigs. Thereafter it failed to incite progressive disease in bovines by ingestion or intravenous inoculation. Later, more calves and monkeys, horses, sheep, goats and asses were inoculated, apparently without ever producing generalized tuberculosis. Only for the guinea pig has some degree of pathogenicity persisted.

There is no definite proof that the R1 bacillus may have been of the bovine type.—R. LOVELL.

DURAND, H., & GASPAR, I. (1932). Formes atypiques du virus tuberculeux. Retour à la forme commune acido-résistante après culture et inoculation. [**Atypical Forms of** *M. tuberculosis*. **Return to Acid-Fast Form following Cultivation and Inoculation**].—*C. R. Soc. Biol. Paris.* **110.** 1288-1289.

The authors record the isolation from a sero-fibrinous pleuritic effusion in a human being of non-acid-fast, cyanophilic bacilli containing granules. These bacilli were sown in plain broth and 27 days later there was a small deposit at the bottom of the tube consisting of non-acid-fast cyanophilic bacilli. The deposit when sown on potato and on Löwenstein's medium produced colonies consisting of cyanophilic bacilli and elements more or less acid-fast consisting of bacilli containing granules, isolated granules and groups of granules.

The deposit from the broth culture when inoculated into a guinea pig caused hypertrophy of the lymphatic glands and of the spleen and acid-fast bacilli were demonstrated microscopically in smears of the glands.

Blood from the patient sown on Löwenstein's medium gave a growth of acid-fast bacilli after one month. A second and somewhat similar case is also described.

—T. M. DOYLE.

MELLON, R. R., & FISHER, L. W. (1932). **New Studies on the Filtrability of Pure Cultures of the Tubercle Group of Micro-Organisms.**—*J. Infect. Dis.* **51.** 117-128. [20 refs.]

The authors have studied an acid-fast organism indistinguishable from the tubercle bacillus which, under special conditions, has produced non-acid-fast granular forms. Cultures of a non-acid-fast diphtheroid showing characteristics entirely different from the original have been obtained from the filtrate after passage through a Berkefeld N filter. Subcultivation of the diphtheroid has produced forms which are identical with the original acid-fast organism.

During a six years study of the organism a spontaneous dissociation to the diphtheroid has been noticed four times, each time in the spring of the year.

Culture filtrates of both avian and bovine types of the tubercle bacillus have also produced the non-acid-fast diphtheroid forms.

It is also stated that similar forms have been obtained from acid-fast granules found in Hodgkin's disease, benign lymphogranulomatosis and Boeck's disease and it is suggested that these granules originate from the tubercle bacillus.

—H. G. LAMONT.

PRICE, R. M. (1932). **Summary of a Study of the Types of Tubercle Bacilli isolated from Human Lesions.**—*Amer. Rev. Tuberc.* **25.** 383-392. 3 tables.

In this article the author gives a good description of the methods adopted for classifying the tubercle bacilli recovered.

In 100 adult cases of tuberculosis composed of 13 so-called medical and 87 surgical cases, the bovine tubercle bacillus was isolated in only two instances ; in one of these mixed avian and human strains were recovered.

In 220 juvenile cases, 30 patients were infected with the bovine type of tubercle bacillus and 190 with the human type. The author concludes that :—

(1) Bovine tuberculosis is an almost negligible factor in adult human infection.

(2) The bovine tubercle bacillus is a factor of considerable importance in childhood tuberculosis, causing 13·6 per cent. of non-pulmonary tuberculosis.

(3) The disease is milk-borne.

(4) Bovine tuberculosis is preventable and can be controlled by the effective pasteurization of milk. He states that no case has been encountered in children brought up on pasteurized milk in the city of Toronto.—H. G. LAMONT.

I. MOUSSU, G. (1932). De l'emploi de la tuberculine dans le diagnostic de la tuberculose et en police sanitaire. [**The Application of Tuberculin in Public Health Work**].—*C. R. Acad. Agric.* **2.** 54-63. [1 ref.]

II. CUMMINGS, S. L. (1932). **Tuberculin in Diagnosis.**—*Brit. Med. J.* Dec. 17th. 1089-1091.

I. Moussu deplores the tendency in veterinary medicine to neglect a clinical examination of a suspected tuberculous animal in favour of a tuberculin test. He cites several instances of contradictions in the test and draws special attention to non-tuberculous animals which gave positive reactions and to advanced cases which failed to respond. Under the first heading, he suggests that cattle in heavily infected herds may inhale large numbers of desiccated tubercle bacilli which are incapable of producing progressive lesions, but which may induce positive tuberculin reactions.

II. Cummings discusses the value of intradermal reactions in the human subject and reasserts a former contention that, whereas in young children a positive response is strongly suggestive of an active focus, in adults in a " civilized " community, it has little or no diagnostic value. He agrees with HART [see this *Bulletin.* **3.** 210.] that a negative response may be of great value, especially in childhood, but draws attention to the occasional loss in tuberculin sensitivity in advanced cases of the disease.

The significance of the subcutaneous test as compared with the intradermal method is also discussed.—R. E. GLOVER.

LOCKAU, U. (1932). Die Tuberkulinisierung des Rindes durch den Tränennasenkanal. [**The Application of the Tuberculin Test to Cattle by Injection through the Lacrymal Duct**].—*Arch. wiss. prakt. Tierhlk.* **65.** 195-197.

NEUMANN-KLEINPAUL in 1928 [*Arch. wiss. prakt. Tierhlk.* **58.** 517.] suggested the use of the lachrymal duct *via* the nasal orifice for applying tuberculin [ophthalmic test] in horses and obtained a favourable result.

The author tested this method of application in cattle and, although it is efficient, the technique of injection is too difficult for this method to replace the ordinary ophthalmic test in practice.—J. E.

I. UHLENHUTH, P., & SEIFFERT, W. (1932). Vergleichende Untersuchungen über die Tuberkulinempfindlichkeit nach Infektion mit Tuberkelbazillen verschiedener Virulenz. [**Comparative Experiments on Tuberculin Sensitiveness after Infection with Tubercle Bacilli of Diverse Virulence**].—*Zschr. Immun.-Forsch.* **74.** 101-115. [8 refs.]

II. SEIFFERT, W. (1932). Untersuchungen über die Variabilität boviner Tuberkelbazillen. [**Research on the Variability of Bovine Tubercle Bacilli**]. —*Ibid.* 116-159. 12 figs. (1 coloured) on 4 plates.

I. By determinations of the minimal dose of tuberculin required to cause a skin reaction or to cause death by intraperitoneal injection in groups of guinea pigs previously inoculated with strains of various virulence, it is shown that the degree of tuberculin sensitivity local and general, is dependent upon the virulence of the infecting strain. This sensitivity can, in both cases, be reduced by intraperitoneal inoculation of a small amount of tuberculin shortly before the tests are made.

With the highly virulent strain used, the minimal dose required to produce

a skin reaction was one-fiftieth (0·002 c.c.) of that generally used (0·1 c.c.), whilst the dose required to produce a lethal effect intraperitoneally (0·1 c.c.) was only a little below that generally used (from 0·15 to 1·0 c.c.). It is suggested that the reported failure to find a marked difference in skin sensitivity whilst finding a difference in general sensitivity (lethal effect of intraperitoneal injections) is due to the fact that the usual skin dose is grossly excessive whilst that used for intraperitoneal injection is not.

The intracutaneous dose of tuberculin necessary to produce a reaction in animals injected with two feebly virulent strains was from 25 to 100 times that required in the case of the highly virulent strain; in the case of a strain of BCG it was from 100 to 150 times. The difference in general sensitivity was much smaller. Even in the case of BCG, large doses (from 1·0 to 1·5 c.c.) of tuberculin intraperitoneally were in some cases followed by death.

II. The author describes in detail the cultural and microscopic characters of the numerous variants which he has obtained from two strains of virulent bovine tubercle bacilli, from a strain of BCG and from a virulent variant obtained from the latter [see (1932). *Klin. Wschr.* **11.** 181]. Observations were made with both liquid and solid media. The variants described include R forms, S forms (moist or dry), giant and other secondary forms. Marked granule formation was observed in microscopic preparations of certain variants. It is suggested that this is associated with a definite disturbance of metabolism and an analogy is drawn with d'Herelle's phenomenon.—A. W. Stableforth.

I. Popper, M., & Raileanu, C. (1932). Recherches sur le rôle du système réticulo-endothélial dans la tuberculose expérimentale du Cobaye. [**Researches on the Rôle played by the Reticulo-Endothelial System in Experimental Tuberculosis of the Guinea Pig**].—*C. R. Soc. Biol. Paris.* **109.** 1379-1381.

II. Thomoff, Z. (1932). Influence du blocage du système réticulo-endothélial sur le phénomène de Koch et sur l'intradermo-réaction tuberculinique chez les Cobayes. [**The Influence of Blockage of the Reticulo-Endothelial System on Koch's Phenomenon and on the Intradermal Tuberculous Reaction in Guinea Pigs**].—*Ibid.* **110.** 168-169. [2 refs.]

III. Thomoff, Z. (1932). Influence de la splénectomie et du blocage du système réticulo-endothélial sur l'allergie tuberculeuse des Cobayes. [**The influence of Splenectomy and Blockage of the Reticulo-Endothelial System on Tuberculous Allergy of Guinea Pigs**].—*Ibid.* 381-382.

I. Experiments were carried out on three groups of guinea pigs, which were treated in the following manner:—(a) intraperitoneal injection of 1 per cent. trypan blue followed after an interval of eight days by a similar injection of virulent tubercle bacilli; (b) a series of ten daily intraperitoneal injections of chinese ink followed by a similar dose of tubercle bacilli after ten days and (c) a control group which received tubercle bacilli only.

From these experiments, the authors observed a relative resistance of guinea pigs to tuberculous infection; the lesions showed a tendency to localization in lymphatic glands. Blockage of the reticulo-endothelial system with chinese ink appeared to produce an extension of tuberculous lesions. Tuberculous allergy was not modified by blockage.

II. Three batches of guinea pigs were used. The first received an emulsion of tubercle bacilli subcutaneously and about four weeks later an intracardiac injection of chinese ink (1 : 20). The second group received three daily injections of trypan blue (intraperitoneally) and at the same time an intracardiac injection of

1 c.c. of chinese ink. Following the last injection, a dose of 5 mg. of tubercle bacilli was given intradermally.

In the third experiment the guinea pigs received 1 mg. of bacilli and at certain intervals afterwards 1 c.c. of 1 per cent. trypan blue intraperitoneally. It is concluded that blockage of the reticulo-endothelial system with chinese ink or trypan blue does not modify appreciably the skin sensitiveness of tuberculous guinea pigs to bacillary bodies and to tuberculin. The author's observations are therefore in agreement with those of FREUND.

III. From a study of three experiments, the author concludes that neither splenectomy nor blockage of the reticulo-endothelial system, alone or together, appreciably diminish allergic resistance of tuberculous guinea pigs.

—G. W. DUNKIN.

RICH, A. R., & LEWIS, Margaret R. (1932). **The Nature of Allergy in Tuberculosis as Revealed by Tissue Culture Studies.**—*Bull. Johns Hopkins Hosp.* **50.** 115-131. 10 figs. on 3 plates, 1 table. [11 refs.]

The effect of tuberculin (" old tuberculin " and certain purified tuberculoproteins) on the cells of tissue cultures was studied. The explants were obtained from the spleen or buffy coat of normal guinea pigs and from animals infected with an avirulent strain of the tubercle bacillus. The tuberculins were tested on these tissues suspended in (a) plasma from infected guinea pigs and (b) plasma from non-infected animals.

It was found that a given dilution of tuberculin, which was without effect on the non-sensitized cells, induced well-marked degenerative changes in sensitized cells. It was also shown that allergic cells were susceptible to this toxic action without the aid of the antibodies in the plasma.

[These observations are in accordance with the findings of ARONSON—see this *Bulletin.* **2.** 515].—R. E. GLOVER.

DEICH. (1932). Zur Immunisierung der Rinder gegen Tuberkulose. [**On the Immunization of Cattle against Tuberculosis**].—*Deuts. tierärztl. Wschr.* **40.** 433-438. 1 table. [13 refs.]

Basing his conclusions chiefly on the fact that no significant difference was found between the results of tuberculin tests carried out at intervals from birth to the second pregnancy on 87 bovines which had been inoculated by Bohme's method—three intracutaneous injections of virulent tubercle bacilli at birth, one month and one year respectively—and those carried out on 57 controls (1,354 tests in all), Deich concludes that this method is of no value in producing an active immunity against tuberculosis.

In considering at some length the results of these experiments the author also discusses the question of active immunity in general. He takes the view that protective inoculation has not solved the problem of creating active immunity against tuberculosis, but that lesions in young animals often heal spontaneously and that the methods of greatest practical significance are those which aim at preserving and increasing natural resistance.—A. W. STABLEFORTH.

I. BIRKHAUG, K. E. (1932). **Protection against Tuberculosis with BCG Vaccine in Guinea Pigs.**—*Amer. J. Path.* **8.** 629-633.

II. BIRKHAUG, K. E. (1932). **Protection against Tuberculosis with BCG Vaccine in Guinea Pigs.**—*Ann. Inst. Pasteur.* **49.** 630-652. 2 tables. [Orig. in English : summary in French].

III. MONALDI, T. de S., & BASSI, U. (1932). Effets de l'inoculation du BCG par scarification sur la cornée des jeunes lapins. [**The Effect of Inoculating BCG**

by scarifying the Cornea of Young Rabbits].—*Ibid.* 416-428. 4 plates. [4 refs.]

I. Following Calmette's cultivation technique, Park No. 10 strain of BCG was found to remain stable over a period of two years. Enhancement of virulence by Dreyer's method failed. BCG produced only local and subsequently healing lesions in guinea pigs which afterwards survived inoculations of virulent organisms longer than normal pigs. Strong cutaneous allergy is taken as an index of raised resistance to tuberculosis.

II. A repetition of the results described in I.

III. The authors conclude that, by scarifying the cornea of young rabbits and instilling BCG vaccine, characteristic lesions are formed in the internal organs which are distinct from true tuberculosis. The infection is benign.

The results were indefinite on account of serious outbreaks of pasteurellosis, pseudotuberculosis and coccidiosis amongst the experimental rabbits used.

—E. J. PULLINGER.

BROERMAN, A., & FOGLE, A. E. (1932). **An Intradermal Test for Detecting Johne's Disease of Cattle.**—*J. Amer. Vet. Med. Ass.* **81.** 795-808. 7 tables. [9 refs.]

After a brief discussion of the intravenous, subcutaneous and intradermal tests and their literature, the authors describe in detail the preparation of johnin for intradermal use, the culture medium being that of HASTINGS, BEACH and MANSFIELD. They then give a method of conducting the intradermal test using a site on the neck. Of 312 cattle tested intradermally, 13 per cent. were positive, 76·6 per cent. were negative and 10·2 per cent. were suspicious, though six of the latter showed symptoms of Johne's disease.

Detailed tables are given of a comparative test of the intradermal and intravenous methods. " Of 312 cattle tested by the intradermal johnin test, 193 (61·8 per cent.) were tested by the intravenous method. Twelve (6·2 per cent.) of the 193 cattle were reactors to both tests and 125 (64·7 per cent.) did not react to either test. One cow gave suspicious reactions to both tests. There was a disagreement between the two tests in 55 (28·4 per cent.) of the cattle." The results are indefinite and only a limited number of *post-mortem* examinations were performed, but the authors conclude that their results indicate that the intradermal johnin test is as valuable as the intravenous test and that when both tests are used the results more nearly agree with the *post-mortem* findings than when one test only is used. The technique of both tests is fully described.—EDWARD F. PECK.

VEENBAAS, A., & SWIERSTRA, J. (1932). Bestrijding van paratuberculose bij het rund. [**The Control of Johne's Disease in Cattle**].—*Tijdschr. Diergeneesk.* **59.** 869-884. 7 tables, 1 chart. [3 refs.] [Summaries in English, French and German : abst. from orig.]

The essence of this paper is a comparison of the results obtained by testing animals suspected of Johne's disease with johnin prepared by Dunkin and avian tuberculin.

The authors find, as others have reported, that the reactions given by infected animals are less pronounced as a rule than those given by tuberculous animals to tuberculin. They also confirm the findings of others that some animals may fail to react altogether. In their tests, clinical cases gave better reactions on the whole with the johnin used than with avian tuberculin. This, however, was not the case in infected but apparently healthy animals.

The paper ends with a plea that the Government should finance a campaign of eradication by indemnifying owners of reacting animals that are slaughtered.

—A. LESLIE SHEATHER.

HAUDUROY, P. (1932). Action de la mannite sur certains Bacilles paratuberculeux. **[The Action of Mannite on Certain Organisms of the Paratuberculosis Group].**—*C. R. Soc. Biol. Paris.* **110.** 559-560.

In these experiments the author employed the following organisms :—*Mycobacterium phlei, M. smegmatis, M. stercusis* (Mist bacillus Moeller) and *M. berolinensis* (Rabinovitch). He found that the addition of 10 to 15 per cent. of mannite to the culture media helped considerably in the production of a very abundant growth. The addition of the mannite to the culture media did not affect the acid alcohol resistant powers of the bacilli.—NORMAN DOBSON.

SABIN, R. (1933). Essais de Vaccination contre la Pseudo-Tuberculose des Rongeurs et des Oiseaux. **[Attempts at Vaccination against Pseudo-tuberculosis of Rodents and Birds].**—*Thesis for Docteur vétérinaire, Alfort.* pp. 60. [24 refs.]

After giving a historical survey of the disease, the author describes the symptoms and lesions in birds, rodents and carnivores, together with the clinical and bacteriological methods of diagnosis. The causal agent, *Pasteurella pseudotuberculosis rodentium*, is the same in all cases although the organism is said to acquire a certain degree of specificity for certain species. The disease is common amongst rabbits, guinea pigs, turkeys and canaries, but rare amongst cats. The symptoms and lesions are not diagnostic, a bacteriological examination being necessary for a precise diagnosis. With regard to vaccination, the author states that rodents can be protected against subcutaneous test doses of culture and there is reason to think that further work may show the same to apply to birds. He failed to protect either rodents or birds against test doses of culture given orally. —GWILYM O. DAVIES.

KAUFFMANN, F. (1932). Vergleichende Untersuchungen an Pseudotuberkulose-, Paratyphus-, Pasteurella- und Pestbacillen. **[A Comparative Study of Pseudotuberculosis, Paratyphoid, Pasteurella and Plague Bacilli].**—*Zschr. Hyg. u. Infektkr.* **114.** 97-105. 7 tables. [5 refs.]

The bacilli of pseudotuberculosis, paratyphoid, haemorrhagic septicaemia and plague are of importance in animal diseases whilst paratyphoid and plague also play their part in human disease. The author reviews the work of others and adds to our knowledge in comparing and differentiating these groups of bacteria. Tables are given showing various differences between these organisms, all of which are Gram-negative rods.

CULTURAL DIFFERENCES BETWEEN PSEUDOTUBERCULOSIS, PASTEURELLA AND PLAGUE BACILLI.

	Pseudotuberculosis.	Pasteurella.	Plague.
Broth	Motile when grown below 30°C.	Non-motile	Non-motile
Litmus milk	Alkaline	Neutral	Neutral (acid according to some authors)
Indol	—	+	—
Saccharose	—	+	—

Serologically the pseudotuberculosis bacilli may be divided into five different types according to their somatic " O " antigens. The flagellar " H " antigens are identical in all the strains examined. The antigenic structure is expressed as follows :—

ANTIGENIC STRUCTURE OF PSEUDOTUBERCULOSIS GROUP.

Type.	" O " antigen.	" H " antigen.
I A	1. 2. 3.	a
I B	1. 2. 4.	a
II A	1. 5. 6.	a
II B	1. 5. 7.	a
III	1. 8.	a

As is well known, the paratyphoid group may be divided into about 30 different serological types and two of the pseudotuberculosis types (II A and II B) have an antigen (5) in common with certain members of the paratyphoid group. This is the somatic antigen IV, [factor II according to British nomenclature—see LOVELL. (1932). this *Bulletin.* **3.** 233.] which is present in *Bact. paratyphosum* B, *Bact. aertrycke*, *Bact. abortus equi*, *Bact. abortus ovis*, *Bact. derby* and *Bact. reading.*

The pasteurella group may be divided into six cultural types based on biochemical reactions, but the author considers that further serological study of this group and the plague bacillus is necessary. [SCHÜTZE—(1932). *Brit. J. Exp. Path.* **13.** 284, 289 and 293.—has elucidated certain difficulties inherent in such a study].—R. LOVELL.

BURNET, F. M. (1932). **Lysogenicity as a Normal Function of Certain Salmonella Strains.**—*J. Path. & Bact.* **35.** 851-863. 5 tables. [19 refs.]

It has been shown that certain culture filtrates may prove to possess bacteriophage not necessarily active against the homologous organism, but capable of lysing some sensitive indicator strain. Study along these lines has shown that a high proportion of strains of salmonella were capable of producing such phage. Two species, namely, *Bact. sanguinarium* and the Glässer type, were apparently never lysogenic, but were highly sensitive to phage action and were used as indicators. Apart from three strains of the Glässer type, every strain of the *Bact. suipestifer*, *-paratyphosum* C, -Thompson group was lysogenic for the Glässer indicator strain. A relatively high proportion of cultures of *Bact. enteritidis*, *Bact. paratyphosum* A and B and *Bact. aertrycke* produced phage attacking *Bact. sanguinarium.* It appears as if a special relationship exists between the antigenic type of the culture producing the phage and the race capable of detecting its presence. This applies mainly to " O " antigens.

Different types of phage which may be differentiated mainly by the type of plaque, were produced by strains of a similar species and the production of two distinct phage types by a single strain is relatively common. This lysogenic property is apparently a stable characteristic in those strains which show no evidence of lysis themselves, but act only on an indicator strain.

It is considered that, in certain bacterial groups, lysogenicity is a normal characteristic. These " naturally " lysogenic strains tend to be found amongst more robust intestinal bacilli such as *Bact. enteritidis* and *Bact. suipestifer* whilst the indicator strains comprise the more specialized parasitic forms such as the Glässer type and *Bact. sanguinarium.*—R. LOVELL.

BARGER, E. H., & TORREY, J. P. (1933). **The Whole-Blood, Stained-Antigen Agglutination Test for Pullorum Disease.**—*J. Amer. Vet. Med. Ass.* **82.** 84-92. 12 figs. [2 refs.]

The authors claim that the whole-blood rapid agglutination test is almost as reliable as the tube test for the detection of fowls infected with *Bact. pullorum*, and that it has the advantages over the tube method of being quicker and cheaper to carry out and requires only one handling of the fowls. The method of bleeding fowls and the technique of the test are described in detail.

Interpretation of doubtful reactions is sometimes difficult and the use of artificial light is of considerable assistance in reading such tests on cloudy days.

The training and experience of the operator, accurately titrated antigen and the use of correct amounts of blood and antigen are important contributory factors to the success of the test.

In order to prevent poultry keepers from being exploited by incompetent persons, the State Department of Agriculture, Illinois, has arranged for accredited qualified veterinarians in different areas to carry out the test.—T. M. DOYLE.

I. ROGER. (1932). Analyse de la thèse de M. Courtehoux sur la Chimiothérapie de l'Avortement épizootique des Bovidés. [**Review of Thesis presented by M. Courtehoux on the Chemotherapy of Bovine Contagious Abortion**].—*Bull. Soc. Méd. vét. prat. Paris.* **16.** 120-122.

II. ARGOUD, fils. (1932). De la transmission à l'homme de " Brucella Abortus." [*Br. abortus* **Infection of Man**].—*Ibid.* 251-255.

III. MCNUTT, S. H., & PURWIN, P. (1932). **Feeding of the Brucella Organism to Chickens and its Effect on Egg-Production of Pullets and on Growth of Young Chicks.**—*J. Amer. Vet. Med. Ass.* **81.** 641-644. 1 fig., 1 table. [2 refs.]

I. COURTEHOUX tested the curative value of intravenous injections of gonacrine and of mercurochrome for bovine contagious abortion. Neither drug was found to have any effect on the course of the disease.

II. Argoud describes a case of brucella infection in a farmer who had some time earlier made a vaginal examination of an infected cow. The patient's serum had an agglutination titre of 1 : 500.

III. The feeding of large quantities of a recently isolated virulent culture of the porcine type of *Br. abortus* to laying hens caused only a temporary slight decrease in egg production. On autopsy no lesions attributable to brucella infection were observed.

A brucella culture [bovine type ?] which was passaged seven times through fowls was fed in large quantities to ten-day-old chicks without causing symptoms or any appreciable adverse effect on growth.—T. M. DOYLE.

STARR, L. E. (1932). **Production of Agglutinins for Brucella Abortus in Calves, Swine and Rabbits by Skin and Mucous Membrane Contact.**—*J. Amer. Vet. Med. Ass.* **81.** 230-238. 4 tables. [4 refs.]

Sera of certain animals agglutinate *Br. abortus* only in low titres. This may be due to contact of their skin or mucous membranes with infective material, infection not being virulent enough or the mode of entry not suitable for the production of clinical symptoms.

Experiments on calves, swine and rabbits with bovine and porcine strains of the organism are described. The porcine strain produced agglutinins of low titre in calves infected by the eye, or by skin scarification. In rabbits it produced agglutinins of high titre when infected by the eye and shaved or scarified skin

and of low titre when infected by the unaltered skin. The bovine strain produced no agglutinins in calves, but, in rabbits, agglutinins of high titre were produced when infected by scarified skin and low titre when infected by the eye.

Both strains produced agglutinins of low titre in pigs by all methods of infection including the oral method.—H. G. Lamont.

Dubois, C., & Sollier, N. (1932). Diagnostic expérimental de la mélitococcie ovine et caprine par la recherche des réactions d'allergie. [**Experimental Diagnosis of Ovine and Caprine** *melitensis* **Infection by Allergic Reactions**]. —*C. R. Acad. Sci. Paris.* **195.** 722-724. [3 refs.]

Dubois, C. (1932). Spécificité de la réaction allergique comme procédé de diagnostic de la mélitococcie ovine. [**Specific Nature of the Allergic Reaction when used in the Diagnosis of Ovine** *melitensis* **Infection**].—*Ibid.* 834-836. [2 refs.]

The authors inoculate about three-tenths of a c.c. of the reagent intradermally, and a specific swelling occurs, persisting for two to four days, if the animal under test is infected. They describe a suspension of killed *Br. abortus* as the most satisfactory reagent and prefer the subcaudal fold as the site of inoculation. A thermal reaction is almost constant. A fairly certain diagnosis, not only of sick animals, but also of carriers, appears to be possible by this test.—Norman Hole.

Johns, E. P., Campbell, F. J. H., & Tennant, C. S. (1932). **A Serological and Clinical Investigation of Individuals exposed to Br. abortus.**—*Canad. Med. Ass. J.* **27.** 490-497. 3 tables. [21 refs.]

In a hospital for epileptics a study was made of 100 patients who had been exposed for a period of at least one year to a raw milk supply known to be infected with *Br. abortus*. Of the 29 cows in the hospital herd, 7 had a serum titre of 1 : 100 or over, and 5 of these had a whey titre of 1 : 100 or over ; *Br. abortus* was isolated from the pooled milk on three occasions. Twenty-two of the patients showed evidence of active infection, and 38 evidence of past infection, whilst 40 showed no evidence of infection. Classification was made on the combined evidence obtained from an agglutination test, a complement-fixation test, an intradermal test and a clinical examination.

Full details are given of the methods used, and of their interpretation, emphasis being placed on the value of a clinical examination and of the intradermal test. —A. W. Stableforth.

Curasson, G., & Didier, L. (1932). Recherches sur les pasteurelloses ovine et bovine. [**Researches on Ovine and Bovine Pasteurelloses**].—*Rec. Méd. vét. exot.* **5.** 121-133. 1 table, 1 chart. [7 refs.]

Ovine, bovine and equine pasteurelloses have previously been recorded, though little studied, in the Sudan, and the authors in this article give an account of their researches upon the two first-mentioned conditions which they again met with in 1928 and 1931. Some breeders have lost as many as 80 per cent. of their sheep and in one district 60 per cent. of an ovine population of 150,000 have died. The losses are nearly all amongst young animals. The disease in sheep occurs in acute, subacute and subchronic forms. All breeds are susceptible. A detailed account of the cultural characters and pathogenic action of the causal organism is given. The authors find that vaccination with formolized culture quickly stops outbreaks of the disease. Where control animals were left amongst the vaccinated, the disease disappeared amongst the latter and continued amongst the former.

Under the heading of bovine pasteurellosis the authors record symptoms and

post-mortem appearances and give an account of the cultural characters and pathogenic action of their bovine strains of pasteurella. The bovine disease involves the lymphatic system, particularly affecting the lymphatic glands. In cattle also a formolized culture was used for vaccination, the vaccine being used at the commencement of outbreaks with good results.—S. H. GAIGER.

I. URBAIN, A., & GORET, P. (1932). Infection et vaccination des poules " per os " avec la pasteurella du choléra aviaire. [**Infection and Vaccination of Chickens by the Mouth with** *Pasteurella aviseptica*].—*Ann. Inst. Pasteur.* **48.** 470-475. [23 refs.]

II. TRILLAT. (1931). Transmission du choléra aviaire par voie aérienne. [**Transmission of Fowl Cholera by the Respiratory Route**].—*Bull. Acad. Méd. Paris.* **106.** 309-311. [3 refs.]

I. From the experiments recorded in this article it appears possible, in the great majority of cases, to infect fowls by direct oesophageal administration of *P. aviseptica.* Vaccination by this route is also possible, provided that either heat-attenuated cultures or non-pathogenic *P. boviseptica* cultures are used. The immunity set up by this means is, however, only a local one ; such vaccinated fowls succumb readily to minute doses given intramuscularly.

II. Fowl cholera infection can be brought about not only by making the animals breathe artificially infected air, but also directly from an infected to a healthy animal kept together in an enclosed space. Dry air appears to be but slightly dangerous in this respect, but the presence of moisture and respiratory elements greatly increases the infectivity of the air.—NORMAN HOLE.

I. OXER, D. T. (1932). **" Pulpy Kidney " or Acute Infectious Entero-Toxaemia of Sucking Lambs due to** *B. ovitoxicus* **(Bennetts).**—*Council Sci. & Indust. Res. Australia. Pamphlet.* No. 35. pp. 9-25. 4 tables. [19 refs.]

II. BENNETTS, H. W. (1932). **" Pulpy Kidney " : A Post-Mortem Change in Experimental Infectious Entero-toxaemia.**—*Ibid.* pp. 26-29. [6 refs.]

I. The author surveys the literature dealing with " pulpy kidney " disease and gives a complete account of observations and experimental work carried out in Tasmania.

The disease was found to affect lambs between the ages of 3 and 13 weeks, but its incidence appeared to be more closely correlated with high condition and a high protein grass diet than with age. No breed susceptibility was noted. Cases in twin lambs were rare. The symptoms, when observed, lasted about four hours and took the form of convulsions and prostration. Characteristic lesions were found when the *post-mortem* examination was delayed, the kidneys being then markedly degenerate and pulpy, and the pericardial sac containing excess of fluid. Cloudy swelling of the hepatic cells and of the cells of the renal convoluted tubules was observed in fresh carcasses, but the macroscopic changes in the kidney were absent. No bacteria could be cultivated from tissues from fresh carcasses.

Experimental work was based upon the theory that the aetiology of " pulpy kidney" disease was the same as that of entero-toxaemia of adult sheep, and intestinal contents from fresh cases were searched for evidence of a bacterial toxin and for anaerobic bacteria. Five cases were so examined and the intestinal contents of four of these were found to be toxic for lambs. The lesions produced in the experimental lambs were similar to those observed in natural cases. The action of the toxin was neutralized by *Clostridium ovitoxicum* antiserum, but not by *Cl. welchii* or *Cl. oedematiens* antisera. An organism isolated from the intestinal contents proved to be morphologically, culturally and serologically similar to

Cl. ovitoxicum. The toxin produced when this organism was grown in broth and inoculated intramuscularly into a lamb produced lesions similar to those found in natural cases. Attempts to reproduce the disease by the opium-belladonna-culture method used by BENNETTS failed. Irregular results were obtained by vaccination with a formolized culture of the organism.

The name " acute infectious entero-toxaemia of sucking lambs " is suggested for the disease.

The author feels that satisfactory recommendations for prevention cannot be made until all aspects of the disease are more fully understood.

II. Two lambs which had died of experimentally produced entero-toxaemia were examined three and four hours after death respectively. The kidney changes regarded as characteristic of " pulpy kidney " disease were noted and putrefactive changes were advanced. No evident changes were seen in two normal lambs killed and examined after the same intervals. Two lambs killed half an hour after feeding with *Cl. ovitoxicum* culture and examined three and four hours later respectively showed advanced putrefaction and incipient degeneration of the kidneys.

The author considers that these results and the fact that degeneration of the kidneys is a characteristic feature of the *post-mortem* changes in animals which have died of entero-toxaemia support OXER's claim that " pulpy kidney " disease and entero-toxaemia are pathologically identical.—R. S. ROBERTS.

I. MCEWEN, A. D. (1932). **Anaerobic Infections of Sheep as seen in the Romney Marsh.**—*Vet. Rec.* **12.** 1069-1082. [1 ref.]

II. MCEWEN, A. D., & ROBERTS, R. S. (1932). **Gas Gangrene Infections of Sheep : Passive Immunisation.**—*J. Comp. Path. & Therap.* **45.** 212-223. 10 tables. [1 ref.]

I. The author gives a description of the area known as Romney Marsh and points out that it is actually a misnomer to refer to it as a marsh because the area, which covers about 120 square miles, is very adequately drained. Infestation with animal parasites does not appear to play any great part in the production of disease within the areas in normal years.

The occurrence of " struck " appears to depend in some way upon the condition of the pastures. When late summer growth is poor, and consequently there is little grazing available for the late winter and early spring, the number of cases increases. In view of the sudden occurrence of death, little can be said of the symptoms. Dulness, lack of rumination and symptoms suggesting the existence of abdominal pain have been noted. An accurate picture of the lesions can only be obtained if *post-mortem* examination is carried out immediately after death, and the author finds that the characteristic lesions are an enteritis and a peritonitis. If examination is delayed the true picture is obscured by *post-mortem* changes of a putrefactive nature. These make their appearance very rapidly.

The bacteriological findings were not absolutely constant, but the organism described by the author as *Clostridium paludis* was present in some of the body tissues or fluids at the time of death. Experiments with cultures of this organism appeared to supply some evidence that, primarily, " struck " is of alimentary origin.

A field experiment in which anatoxin was used as a prophylactic had a somewhat inconclusive result as the season was a mild one, as far as the disease was concerned. A note of warning is given regarding inoculation on the marsh, because the inoculation is likely to lead to gas gangrene owing to accidental contamination from the soil. It is recommended that the inner aspect of the thigh, the usual place, be avoided and that the back is suitable and convenient.

Gas gangrene, or " ganger " as it is called locally, follows injury or surgical interference and the organism most frequently responsible is *Cl. chauvoei*. It frequently occurs during the lambing season, particularly during the latter half of the season, and evidence tends to show that the shepherd may act as a vehicle for transmission of the infection. *Cl. septique* and *Cl. oedematiens* have been recovered from some of the cases, but *Cl. chauvoei* appears to be the important causal factor.

It is generally held by shepherds on the marsh that actual laceration of any tissue is not essential for infection to occur. Cases are observed after rough handling such as would produce bruising only.

As the disease is irregular in its incidence, there is some difficulty in assessing results following the use of antiserum or culture with antiserum in the field, but so far as results can be judged they are reported as favourable.

II. The authors summarize their views regarding the causal organism of gas gangrene in sheep, and re-affirm that *Cl. chauvoei* is the cause of the condition, and that when *Cl. septique* is encountered it is a *post-mortem* invader.

Local opinion among farmers on the Romney Marsh, where the investigations were carried out, was to the effect that there would be no likelihood of extensive protective inoculation being carried out. They would prefer to take the risk of cases occurring rather than go to the trouble and expense of vaccination. The authors detail the experiments carried out in preparing and testing the value of an immune serum which was obtained from a horse using an ovine strain of *Cl. chauvoei* as antigen.

As cases of gas gangrene are most frequently observed in ewes at parturition, it was thought that a protective serum might possibly be of some service if it could be injected into any ewe which required assistance at lambing. The serum prepared was found capable under conditions of the experiments of averting a fatal result when there was an interval of four hours between the injection of the infecting culture and the injection of the serum. The dose required to protect a sheep in experiments was 20 c.c. of serum, provided that the infecting dose was not too large. Control sheep died.—A. Leslie Sheather.

I. Burrows, W. (1933). **Growth of Clostridium botulinum on Synthetic Mediums.**—*J. Infect. Dis.* **52.** 126-137. 5 tables. [13 refs.]

II. Hall, I. C. (1933). **Further Outbreaks of Botulism in the Rocky Mountain Region.**—*Amer. J. Hyg.* **17.** 235-251. 2 tables. [9 refs.]

I. Working from the hypothesis that there are essential amino-acids which are necessary for the development of specific bacteria, the author, using *Cl. botulinum*, found that cystine, leucine or alternatively isoleucine, and proline or alternatively oxyproline were essential to the growth of his strains of *Cl. botulinum*. Lysine and glycine, while not essential, were active in promoting growth of these strains. He states that *Cl. chauvoei*, *Cl. sporogenes*, *Cl. welchii*, *Cl. histolyticum* and *Cl. tetani* would not grow on synthetic medium which supported *Cl. botulinum*. He observed that Type A culture of *Cl. botulinum* showed better growth on these mediums than either of his two Type B cultures.

II. This is a detailed account of seven outbreaks of botulism in man which have occurred in the Rocky Mountain region of the United States since April 1st, 1929. Referring to altitude, Hall considers that the pneumonia observed in these cases may have been complicated by this factor, but he is dubious that the reason for more than half the cases of botulism occurring in the United States being found in the Rocky Mountain region is because the boiling point of water is relatively low, thus preventing the sterilization of canned foods. He deprecates the use of

botulinum antitoxin in man in doses of less than 100,000 to 200,000 units and suggests that expense may be saved by using Type A antitoxin only as Type B toxin has never been recorded in this locality.—Edward F. Peck.

Plum, N. (1932). Verschiedene Hyphomyceten-arten als Ursache Sporadischer Fälle von Abortus beim Rind. [**Various Kinds of Fungi as Causes of Sporadic Cases of Abortion in Cattle**].—*Acta path. et microbiol. Scand.* **9.** 150-157.

Reference is made to an earlier publication (1929) on the same subject by Plum and Bendixen in which 17 cases were described. In eight instances *Aspergillus fumigatus* and in two cases *Absidia ramosa* with saprophytic bacteria were recovered ; in the remaining seven both fungi were discovered. In these cases the foetal membranes presented a leather-like appearance and the foetal cotyledons had pieces of the maternal cotyledons up to 1 cm. in thickness firmly attached to them.

In dealing with the foetal material from cases of abortion, of which from 10,000 to 12,000 specimens are handled annually in the laboratory, examinations for fungi were only carried out in those cases in which the foetal membranes presented the leathery appearance described above, or in which abortion bacilli, tubercle bacilli or spirillae could not be detected. Between November, 1928 and May, 1929, 4,133 cases of abortion were investigated. Fungi were found in 52, abortion bacilli in 1,293, tubercle bacilli in 64 and in 2,027 no specific organisms were found. In 697 cases the material was not suitable for examination.

What information is available appears to indicate that, in the cases of abortion due to fungi, the abortion takes place at a relatively late stage of pregnancy. It is, however, admitted that there is as yet little information regarding the clinical aspects of the subject.

Ninety-four ordinary agglutination tests were carried out and in ten instances a positive reaction was obtained. This must not be taken as definite evidence of the occurrence of mixed infections, as in some of them the positive reaction may have been due to inoculation with abortion vaccine.

Aspergillus fumigatus was cultivated in 82 instances, and in 69 of these the cultures were pure. *Aspergillus versicolor* was recovered from five cases—three pure. *Aspergillus flavus* was obtained in pure culture once.

Absidia ramosa, *Absidia Lichtheimi* and *Mucor pusillus* were obtained in a smaller number of cases.

No evidence is produced that the organisms recovered were actually the cause of abortion although quotations are made from literature that the fungi are pathogenic at times.—A. Leslie Sheather.

Gillain, J. (1932). Actinomycose causée par un représentant de la section Actinomyces Breviora. [**Actinomycosis caused by a Representative of the Group** *Actinomyces breviora*].—*Ann. Méd. vét.* **77.** 415-420. [4 figs.]

A description is given of a case of actinomycosis involving the superior maxilla and the neighbouring structures in a bovine. This is followed by a brief study of the cultural characters and pathogenicity of the isolated organism, which the author considers should be named *Actinomyces ruandae*. [The laboratory study of the organism seems much too incomplete to justify the recognition of a new species]. —Gwilym O. Davies.

Brown, H. C., & Broom, J. C. (1932). **Further Observations on Bacterial Cataphoresis.**—*Brit. J. Exp. Path.* **13.** 334-337. 1 chart. [1 ref.]

The authors show that different strains of the same organism do not behave in the same manner in electrophoretic experiments. Working with a number of typhoid-salmonella organisms they show that variation may occur in three different ways :—(1) all the individual bacteria may migrate at uniform speed ; (2) individual bacteria may migrate at greatly differing speeds and (3) the bacteria may remain practically stationary even in a strong electric field. In the second and third instances it is impossible to measure the migration rates. Attempts to change one type of organism into another by subculture or treatment with a number of solvents or other chemicals have failed.

The heating of suspensions of bacteria having a high negative charge in solutions of salts with monovalent cations reduces this charge approximately to zero, whereas no such effect is obtained if the cation is polyvalent.

—W. R. Wooldridge.

DISEASES CAUSED BY PROTOZOAN PARASITES.

Biester, H. E., & Schwarte, L. H. (1932). **Studies in Infectious Enteritis of Swine. VI. Immunity in Swine Coccidiosis.**—*J. Amer. Vet. Med. Ass.* **81.** 358-375. 5 figs. [19 refs.]

The author reviews literature dealing with immunity to coccidiosis in all species and finds that the majority of authors have noted the development of some resistance after infection.

The present paper is an account of an extensive series of experiments in which swine were fed with suspensions of oocysts of swine coccidia and the results observed and estimated by frequent determination of the numbers of oocysts eliminated.

In normal swine the curve of oocyst elimination was found to be remarkably consistent, commencing on the 7th day and terminating on the 21st day after feeding of oocysts. Swine which had already been infected showed an increased resistance for a very short period. When massive quantities of oocysts were administered daily for several months a complete immunity appeared, but 21 days from the termination of the immunization process they were again susceptible. The quantities of oocysts fed made no material difference. In all experiments the infection was found to be definitely self-limiting.—R. S. Roberts.

Carpano, M. (1932). **On the Principal Types of Piroplasm observed in Bovines in Egypt.**—*Bull. Min. Agric.* [*Egypt*]. No. 116. pp. 20. 7 plates. [4to.] [10 piastres]

The author adopts the classification and nomenclature suggested by Mesnil and the further division of the *Babesiella* as suggested by Yakimoff instead of the simpler classification suggested by Wenyon.

Piroplasmosis is said to be the most serious affection of bovines in Egypt. The indigenous animals contract piroplasmosis within a few months of birth and may become markedly sick, whilst in later life they are subject to reinfection or, if they remain latently affected, to serious relapses. A great variety of clinical forms of the disease are encountered owing to the different reaction to infection of indigenous and imported cattle and to different couplings which may occur between the various piroplasms.

The author records the existence of *Piroplasma* [*Babesia*] *bigemina*, *Babesiella* [*Babesia*] *bovis*, *Gonderia* [*Theileria*] *mutans*, *Theileria annulata* and *Anaplasma marginale*. He prefers to keep an open mind on the suggested identity of

G. [*Theileria*] *mutans* and *T. annulata* and proposes to undertake further research on that subject.—U. F. Richardson.

I. Nicolau, S. (1932). Quelques propriétés d'un Toxoplasme qui infecte spontanément les Cobayes. [**Some Characteristics of a Toxoplasma which naturally infects Guinea Pigs**].—*C. R. Soc. Biol. Paris.* **110.** 763-766. 1 fig. [6 refs.]

II. Coutelen, F. (1932). Existence d'une toxoplasmose spontanée et généralisée chez le Furet. Un Toxoplasme nouveau, *Toxoplasma laidlawi* n. sp., parasite de *Mustela* (*Putorius*) *putorius* var. *furo*. [**The Existence of a Natural Generalized Toxoplasma of the Ferret. A New Toxoplasma, *Toxoplasma laidlawi* n. sp., Parasite of *Mustela* (*Putorius*) *putorius* var. *furo***].—*Ibid.* **111.** 284-287. [4 refs.]

I. This paper describes a toxoplasma occurring naturally in the brains of guinea pigs. The parasites are in the form of crescents from 4 to 6μ long by from 1 to 2μ broad, with a distinct nucleus, occurring in cysts with a distinct membrane found in the endothelial and neuroglia cells. The spleen of an infected guinea pig is enlarged, but parasites have not been detected in the organ. Rabbits, mice and pigeons can be infected experimentally and in pigeons it has been proved that the spleen contains the organism.

II. In Laidlaw's work on distemper, 150 English ferrets were examined for toxoplasma, and 12 were found to be infected. The toxoplasma are found in the brain, lung, liver and kidneys as ovoid bodies from 3 to 2μ long by 1·5μ broad. The parasites are grouped in varying numbers in cells which are reduced to their membranes which form the walls of a pseudocyst. In the brain the toxoplasma are found in the neuroglia and endothelial cells and are most numerous in the region of the choroid plexus. The liver is the most highly infected organ and the parasites may even invade the parenchyma cells.—U. F. Richardson.

Schwetz, J. (1932). Sur quelques spirochètes animales de la région de Stanleyville. [**On Some Animal Spirochaetes of the Stanleyville Area**]. —*C. R. Soc. Biol. Paris.* **111.** 232-233. [3 refs.]

Spirochaeta theileri is not commonly encountered in the Belgian Congo. Two cases are recorded in bulls associated with an infection with *T. mutans*, the animals being in good condition. Two cases are recorded on an East Coast fever infected farm, in one of which the spirochaetes were very numerous in the blood, probably due to the influence of coexisting East Coast fever infection. On subinoculation, a goat contracted a spirochaetal infection, but a guinea pig proved resistant. Spirochaetes have also been encountered in the Belgian Congo in monkeys and bats.—U. F. Richardson.

DISEASES CAUSED BY VIRUSES.

Hecke, F. (1932). Die Eignung verschiedener Gewebsarten zur Züchtung des Maul- und Klauenseuchevirus. [**The Suitability of Different Tissues for the Cultivation of the Virus of Foot and Mouth Disease**].—*Zlb. Bakt. I.* (*Orig.*). **125.** 321-329. 3 figs., 5 tables. [2 refs.]

The virus was found to multiply in cultures of embryo skin, oesophagus and lung and also in cultures of testis from the adult guinea pig. In these tissues, series of subcultures were successfully made.

Irregular results were obtained in cultures of mammary gland tissue and of

the kidneys of adult guinea pigs or of embryo stomach or intestine, but in certain instances the degree of multiplication of the virus which occurred in cultures of these tissues was considerable. The experiments with cultures of brain tissue also appeared to give irregular results ; no satisfactory conclusion was arrived at as to whether the virus propagated in this tissue or not. It is noted that no growth of the brain tissue was observed in these cultures, although this might not have been the explanation of the inconsistent results. No multiplication of the virus was detected in cultures of liver, parotid gland, adrenal, bone marrow or skeletal muscle ; indeed, in cultures of these tissues the virus had died out after 24 to 48 hours incubation at 37° or even at 30°C.—I. A. Galloway.

Manninger, R., & Csontos, J. (1932). Ueber den Virusgehalt der Lymphknoten von Schweinen nach der Ansteckung mit Schweinepestvirus. [**On the Presence of Virus in the Lymph Glands of Pigs after Infection with Swine Fever**].—*Arch. wiss. prakt. Tierhlk.* **65.** 105-116. 1 table. [2 refs.]

The author examined the lymph glands removed from two groups of pigs, 18 pigs vaccinated by the simultaneous serum-virus method and four pigs infected with virus alone. The former group of pigs had shown temperature reactions after vaccination and it is noted that eight control pigs inoculated with the virus used for the simultaneous injection died of swine fever within three weeks. The second group of four pigs were the survivors of a batch of 32 infected with swine fever virus.

In the group of 18 vaccinated pigs, the presence of virus was detected in the lymph glands of two out of four pigs killed on the 21st day after injection. No virus could be demonstrated in the lymph glands of the other two pigs killed on the 21st day or in those from the other 14 pigs killed on the 25th to the 199th day.

The presence of virus was detected in the lymph glands removed from only one out of four of the pigs belonging to the second group (i.e. the pigs infected with virus alone). This single pig was killed on the 26th day after infection. The virus was not demonstrated in the lymph glands of the other three pigs of this group killed on the 45th, 65th and 159th day respectively. The authors found that some of the lymph glands removed from the 22 pigs under discussion were markedly haemorrhagic, but they do not attach any importance to the observation nor do they consider the appearance to be associated with swine fever virus infection, as they had found lymph glands having a similar character in pigs believed not to have been infected with swine fever [compare Michalka—(1931). *Arch. wiss. prakt. Tierhlk.* **63.** 529—who is of a contrary opinion].

The authors emphasize the care which should be exercised in experiments of this nature to ensure that the test animals are free from any extraneous source of infection. They also point out that, in order to obviate a misinterpretation of results, it is very necessary to be certain of the diagnosis of the disease resulting from test inoculations and especially to avoid confusion of paratyphoid of pigs, due to infection with *Bact. suipestifer*, with swine fever virus infection. It might not be amiss to give in detail a specific example, which rather conveniently presented itself in the authors' series of tests to illustrate the latter point. An emulsion of the lymph glands removed from the pig killed on the 65th day after infection with swine fever virus was inoculated into a susceptible pig. The latter showed a febrile reaction 10 days after the injection and died 9 days later. On autopsy among other lesions a hyperplastic condition of the spleen was recorded ; this lesion, as has been pointed out elsewhere by Manninger, may be encountered in cases of swine fever complicated by infection with *Bact. suipestifer* or in paratyphoid of pigs due to infection with this bacillus alone. *Bact. suipestifer* was recovered

from the spleen in the present case and, whereas a pig inoculated with an emulsion of the organ developed a febrile reaction and *Bact. suipestifer* was recovered from the blood, a pig inoculated with a filtrate prepared from the spleen remained well and later proved susceptible to infection with swine fever virus. This experiment showed definitely that the pig inoculated with the emulsion of the lymph glands died of the bacillary infection and that the virus of swine fever was not concerned.

The authors discuss their results in relation to those of MICHALKA [see above] with which they are not in agreement. The latter author examined the lymph glands of 21 pigs which had been inoculated with virus alone or virus and serum in the simultaneous vaccination method ; in 16 of these (76 per cent.) he claimed to have demonstrated the presence of virus even up to a period of 10 months after the injection of virus and this observation led him to suggest the possibility of an "infektionsimmunität" or, in other words, the existence of "carriers." The authors of the present paper state that their results do not bring any evidence in support of such a conception.—I. A. GALLOWAY.

HUF, J. E. L. J. A. M., & BECK, D. J. (1932). Een Geval van Encephalitis na Besmetting met Pokken Afkomstig van de Koe. [**A Case of Encephalitis following Infection with Pox transmitted from Cows**].—*Tijdschr. Diergeneesk.* **59.** 400-401.

The children of a farmer contracted cow pox from cows on which there were udder lesions and a three-year-old child developed encephalitis complicating the pox infection. The case record is given.—J. E.

DONATIEN, A., LESTOQUARD, F., & LAFENÊTRE, H. (1932). Essais de vaccination anticlaveleuse en France. [**Tests of Anti-Sheep Pox Vaccination in France**]. —*Rev. vét. et J. Méd. vét.* **84.** 565-568. [1 ref.]

This article sets out to prove that the anti-sheep pox vaccine prepared at the Pasteur Institute in Algeria and issued by the Bouisson-Bertrand Institute in France, is both innocuous and efficacious. The vaccine consists of a sensitized Algerian virus.

Despite the success claimed for it, various veterinarians have stated that it may on the one hand cause the disease or on the other hand offer no protection. The authors state that the first charge arises from the fact that veterinary surgeons are often called upon to vaccinate apparently healthy sheep in flocks in which the disease has already broken out. In such circumstances the owner does not disclose the presence of infection in order to avoid coming under the sanitary regulations and so, in reality, sheep which may already be infected are vaccinated.

The authors have to admit the possibility of the second charge although every precaution is taken to eliminate the inactivation of the vaccine. In order to ensure successful vaccination, veterinary surgeons are strongly recommended to re-examine the sheep a week after vaccination in order to satisfy themselves that a local reaction has taken place.—GWILYM O. DAVIES.

VERGE, M. J. (1932). Recherches sur la micro-flore du poumon dans les formes pulmonaires de la maladie de Carré. [**Researches in the Bacterial Flora of the Lungs in Canine Distemper**].—*Rec. Méd. vét.* **108.** 65-80. [80 refs.]

The investigations carried out and described by the author in this paper are preceded by a very full account of those of other workers from SEMMER (1875) to LOCKHART (1930).

Ten cases were investigated and a description of the organisms most frequently met with is given, together with cultural and morphological characteristics. In

order of frequency they were a coliform bacillus, a pyogenic streptococcus, *Bact. paratyphosum* B, *Brucella bronchisepticus*, staphylococci, *Pseudomonas fluorescens*, and *Proteus vulgaris*. *Pasteurella canis* was not seen in any one of the cases studied.

—G. W. Dunkin.

Brandly, C. A., & Bushnell, L. D. (1932). **Studies of Some Virus Diseases of Fowls.**—*J. Amer. Vet. Med. Ass.* **80.** 782-790. [48 refs.]

The authors discuss some of the principal facts in connection with the virus diseases of fowls. They point out that fowl pox, laryngotracheitis, psittacosis and fowl plague typify many features of the virus diseases of human beings and animals. They state that the transmission of fowl pox virus to mammals by certain workers confirms " the conception that the poxes of the different domestic animals may be nothing more than local varieties of a generic pox, probably variola." [It is not generally accepted that the virus of fowl pox can be successfully transmitted to mammals.]

They describe the manifestations of laryngotracheitis and fowl pox and discuss the chief points in connection with the artificial immunization of birds against fowl pox. They showed that the virus of laryngotracheitis obtained from adult fowls was not enhanced in virulence by passage through chicks, and in no instance was it found possible to set up typical infection in adult fowls with the virus obtained from chicks.

In considering collectively some of the aspects of the virus diseases of fowls, a remarkable resemblance is noticed in certain features : it remains to be determined whether some of the diseases now regarded as separate entities have not a closer relationship to some of the other diseases.

The authors state that Cooper proved that " Ranikhet disease " in India, Newcastle disease in England and avian or fowl pest are immunologically identical.

[The " avian pest " referred to by Cooper was the disease studied by Rodier in Manila, Philippine Islands, which he proved to be immunologically indistinguishable from Newcastle disease. The use of the term " fowl pest " by Rodier was unfortunate and illustrates the necessity for accurate nomenclature, but it was abundantly clear from the context of his article that he did not refer to fowl plague.

Rodier in a preliminary article—(1928). *Proc. Soc. Exp. Biol. New York.* **25.** 781.—called the new disease " Philippine fowl disease " and he stated—

" there appears to be strong evidence that this disease is caused by a filterable virus and that the disease represents a disease of fowls heretofore unknown. Fowl pest (i.e. fowl plague) is transmitted by minute quantities of blood to healthy fowls but this disease (i.e. Philippine fowl disease) is not so transmitted "].

—T. M. Doyle.

Hallauer, C. (1932). Ueber das Verhalten von Hühnerpestvirus in der Gewebekultur. [**The Behaviour of the Fowl Plague Virus in Tissue Culture**].—*Zschr. Hyg. u. Infektkr.* **113.** 61-74. [29 refs.]

Growth occurred in actively growing tissue in Carrel flasks prepared according to the usual technique now employed in tissue culture. There was little or no multiplication of the virus when the tissue cells were not proliferating or were introduced into the medium in very small amounts and no growth took place in the absence of living cells. The virus was shown to multiply in tissue culture containing minced whole chick embryo, and also equally well when pigeon, goose or duck embryos were used instead, but no growth occurred in media containing rat or mouse embryos. The different avian tissues varied greatly in their suitability for promoting growth of the virus. No growth took place with cultures of fibro-

blasts or macrophages. Well-marked multiplication occurred, however, in cultures of brain or skin tissue, or in pure epithelial cells, from the iris. For example, in tissue culture of brain substance transplanted at four days interval, the virus was shown to have increased 10^{36} times in 36 days. The rapid multiplication of the virus in brain tissue soon brought about degenerative changes and death of the cells, so that the concentration of virus quickly fell after four days incubation. The morphological changes in the cells are said to be characteristic. There was no attenuation in the virulence of the virus after prolonged culture. The cellular affinities of the virus in tissue culture would indicate that it has epitheliotropic or encephalotropic properties.—J. T. Edwards.

Monteiro, J. L. (1932). Sur les " Rickettsioses." [**The "Rickettsioses"**].—*C. R. Soc. Biol. Paris.* **110.** 858-860. [5 refs.]

This brief paper is an academic consideration of the classification of the exanthematous fevers of man. The author is of the opinion that the diseases in which rickettsia bodies are discoverable should be separated from the true " virus " diseases and classified separately as " rickettsioses."—A. Leslie Sheather.

Pinkerton, H., & Hass, G. M. (1932). **Typhus Fever. IV. Further Observations on the Behaviour of *Rickettsia prowazeki* in Tissue Cultures.**—*J. Exp. Med.* **56.** 131-143. 4 figs. on 1 plate, 1 table. [4 refs.]

Pinkerton, H., & Hass, G. M. (1932). **Typhus Fever. V. The Effect of Temperature on the Multiplication of *Rickettsia prowazeki* in Tissue Culture.** *Ibid.* 145-150. 1 table, 1 chart. [2 refs.]

The authors have improved their technique of tissue culture of rickettsiae. They describe the histological appearance of cultures examined at intervals, kept alive by transplants, for 52 days. The rickettsiae increase rapidly up to the 14th day in the transfers and guinea pig inoculations show no loss of virulence. The incubation period in guinea pigs appears to depend upon the number of visible rickettsiae inoculated. The methods of multiplication and spread of the organisms in the tissue cultures are discussed.

A number of culture experiments at various temperatures show that 32°C. is the optimum for the intracellular multiplication of rickettsiae *in vitro*.

—Norman Hole.

Bedson, S. P. (1932). **The Nature of the Virus of Psittacosis.**—*Vet. J.* **88.** 565-568. 4 figs. [11 refs.]

Bedson, Western, and Levy Simpson (1930) proved during the psittacosis epidemic of 1929 to 1930 that the aetiological agent of the disease was a filtrable virus.

A little later several workers demonstrated numerous minute coccus-like particles in stained preparations of virulent material ; in smears these particles appear to be both free and intracellular, whereas in sections they are always intracellular.

Subsequent work by Bedson and Western on filtration pointed to the virus being represented by particles of considerable size and this view was supported by the fact that it could be thrown down by centrifugation.

They showed that the virus was not always present in the form of elementary bodies and the different forms observed suggested a developmental cycle. The morphology of the various forms is described.—T. M. Doyle.

DISEASES CAUSED BY METOZOAN PARASITES.

HANDSCHIN, E. (1932). **Investigation on the Buffalo Fly (*Lyperosia exigua* de Meij) and its Parasites in Java and Northern Australia.**—*Council Sci. & Indust. Res. Australia. Pamphlet.* No. 31. pp. 24. 2 figs.

This is a preliminary report of work done during the previous two years in Java and Northern Australia. It follows on a previous note by TILLYARD [see this *Bulletin*. **3.** 30].

The main facts ascertained in the course of the work were as follows :—The buffalo fly is attracted to the host by its odour, warmth and sweat. The buffalo is most attractive and cattle, horses, dogs and human beings are progressively less attractive. The flies live normally on the host, but the females leave them to oviposit in fresh dung pads while their moisture content is still high. The larvae develop in the dung and it is in that stage that they may be attacked by various parasites, the most important being the small wasps *Spalangia sundaica* and *S. orientalis* which lay eggs in the pupae of many muscid flies including *Lyperosia*. The life histories of both *Lyperosia* and *Spalangia*, now fairly well known, are described. An attempt to adapt strains of *Spalangia* to parasitize buffalo fly pupae was made with some degree of success : further progress is anticipated.

The author considers that the damage done by the buffalo fly in Northern Australia has been overrated and that the climatic conditions have an adverse effect on the health of livestock.

A further paper including all the detailed technical information about the scheme of research is promised at some future date.—J. E.

CUTHBERTSON, A. (1932). **Notes on the Habits of Some Diptera in Rhodesia.**—*Proc. Rhodesia Sci. Ass.* **31.** 31-36.

The writer gives brief notes on the occurrence and habits of 42 species of Rhodesian Diptera. Some of the species dealt with are agricultural pests, others are domestic and sanitary pests, while the remainder more closely affect livestock. Amongst the latter the following myiasis-producing flies are mentioned :—*Chrysomyia albiceps*, *C. putoria*, *C. bezziana*, *C. chloropyga*, *Lucilia cuprina* and *L. sericata*. Other Calliphoridae are recorded as breeding in carrion. The blood-sucking flies include *Stomoxys bilineata*, *S. nigra*, *S. brunnipes*, *S. calcitrans* and *Lyperosia minuta*.

Musca crassirostris, the only true biting species of *Musca*, is abundant and causes great annoyance to cows, resulting in a decreased milk yield. Other muscid flies recorded, which feed on exudates from the eyes or animal wounds or blood oozing from the bites of *Stomoxys* or *Lyperosia* are *Musca interrupta*, *M. lusoris*, *M. sorbens*, *M. vetustissima* and *M. xanthomelas*.—J. S. STEWARD.

I. IMMS, A. D. (1932). **Temperature and Humidity in Relation to Problems of Insect Control.**—*Ann. Appl. Biol.* **19.** 125-143. 2 figs., 5 tables. [30 refs.]

II. MELLANBY, K. (1932). **The Influence of Atmospheric Humidity on the Thermal Death Point of a Number of Insects.**—*J. Exp. Biol.* **9.** 222-231. 5 figs., 2 tables. [11 refs.]

[Paper I was read as Presidential Address before the Association of Economic Biologists, London, on Feb. 26th, 1932].

I. The author limits himself to the consideration of certain aspects of the subject, and more especially with regard to recent developments.

The paper is purely of entomological interest and does not include insects of veterinary interest.

II. The writer describes a technique for exposing small insects to high temperature and air of controlled humidity for one hour and 24-hour experiments.

In the experiments lasting one hour and at all ranges of humidity *Pediculus humanus* adults could survive at 46°C. and *Xenopsylla cheopis* adults at 40·5°C. ; *Lucilia sericata* survived 43°C. and *Xenopsylla cheopis* larvae 39·5°C. In the experiments lasting 24 hours all the species tested [*Pediculus*, *Lucilia* and *Xenopsylla*] died below 40°C. regardless of humidity, and in dry air the larvae of *Xenopsylla* and the *Lucilia* and *Pediculus* adults at considerably lower temperatures. In the latter case death appeared to be due to desiccation, whereas in moist air death was presumably caused by the heat.—J. S. Steward.

Dinulescu, G. (1932). Recherches sur la biologie des Gastrophiles. Anatomie, physiologie, cycle évolutif. [**Researches on the Biology of Gastrophilus. Anatomy, Physiology and Life Cycle**].—*Ann. Sci. nat. Zool.* **15.** pp. 1-183. 43 figs., 8 plates, 13 tables, 7 charts. [9 pages of refs.]

This extensive monograph is divided into three parts :—

Part I. [pp. 13-77] consists of a description of the morphology and anatomy, 50 odd pages being devoted to larval stages while the adults are described in 7 pages. Keys for the identification of larvae and adults are provided.

Part II. [pp. 78-124] is devoted to the physiology, chiefly of the larval stages. The author confirms Weinberg's observations that the larvae are haematophagous—after hatching, the larvae wander for a time without feeding until they reach the buccal mucosa of their hosts. As soon as they feed on blood the larvae lose their transparency and their internal organs become reddish. In their migrations the larvae stop from time to time to draw blood.

The mouth of the first-stage larva is provided with two labial plates with which to cut the tissues ; two mandibles and a median stylet serve to penetrate the capillaries. In the second and third stages in place of the labial plates two strong hooks develop for the fixation of the larva to the intestinal wall. Two salivary glands secrete an anticoagulant saliva. The absorbed blood reaches the midgut for digestion and the anticoagulant effects of the saliva soon disappear and the blood is slowly haemolysed and absorbed. The development of tyrosinase is traced and its amount estimated in each stage from egg to adult. Biochemical investigations were made on metabolism and digestion in the larvae. Though the larvae normally consume oxygen they can remain alive for up to 17 days when deprived of free or dissolved oxygen.

Part III. [pp. 125-171] is concerned with the life cycle. The number of eggs laid varies ; *G. intestinalis* and *G. pecorum* (from 1,000 to 2,500 eggs per female) appear to be far more prolific than the other species. It is established that *G. haemorrhoidalis* oviposits on the lips, *G. nasalis* in the mandibular space, *G. inermis* on the cheeks and face ; *G. intestinalis* on the limbs, chest and abdominal walls and *G. pecorum* on the hoofs.

For hatching *G. intestinalis* eggs are shown to require the warmth and moisture provided by the host in biting and licking ; *G. haemorrhoidalis* hatches spontaneously as do the other species which oviposit near the mouth of the host, but eggs laid on distal parts need to be disoperculated by the host. Incubation takes from five to six days. The first-stage larvae of *G. intestinalis* and *G. haemorrhoidalis* penetrate into the tongue for preference while that of *G. inermis* prefers the mucosa of the cheeks. Second-stage larvae migrate to the pharynx and there affix themselves particularly under the epiglottis ; their stay in that situation is temporary and they each seek their own special habitat :—the stomach for the larvae of *G. intestinalis* and *G. haemorrhoidalis*, the rectum for *G. inermis* and also *G. haemorrhoidalis* ;

G. nasalis and also *G. meridionalis* seek the pyloric region of the duodenum and *G. pecorum* the stomach and sometimes the rectum.

The second to third stage lasts from 45 to 60 days. The larvae of *G. meridionalis* live through the second stage in the substance of the intestinal wall provoking (fibrous) " tumour " formation around themselves ; they emerge in the third stage. During the third stage the larvae continue to grow and then leave their habitat and the final nymphal stage lasts from 16 to 20 days for *G. haemorrhoidalis* and from 22 to 28 for *G. intestinalis*.

The maximum duration of life observed in the adult was three days ; the period of life is limited by possession of a defective digestive apparatus. Females have been known to follow horses for from 20 to 30 km. The specificity of their parasitism is discussed and cases of occurrence in pigs, dogs and human beings and even in birds are mentioned. Experimentally the author has succeeded in rearing to nymphs *G. intestinalis* in the stomachs of dogs and primary larvae have lived 22 days in the mouths of guinea pigs.

The remainder of the paper deals with the development of the stages in the host, the emergence of the adult fly and a comparison of *Gastrophilus* with other Oestridae—the migrations of the former being confined to the digestive tract of the hosts, while those of the latter are more extensive.—J. S. Steward.

I. Johnstone, R. N. (1932). **Sheep Dipping. Requirements of the Act.**—*J. Dept. Agric. Victoria.* **30.** 77 80. 4 figs., 1 photograph.

II. Simpson, R. (1932). **A Consideration of the Difficulties in Connection with the Eradication of Sheep Scab in Great Britain.**—*Vet. J.* **88.** 130-133.

III. Pillers, A. W. N. (1932). **Some Aspects of Sheep Scab Control.**—*Ibid.* 323-325.

I. The author gives a short account of the life history of the sheep " tick " [ked, *Melophagus ovinus*] and sheep louse (*Trichodectes*). The latter cause the greater damage to the fleece and are usually found about the front of the shoulder blade or neck.

Under the Sheep Dipping Act, every owner must shear all his sheep within the prescribed time and must dip all his sheep and lambs immediately after shearing or keep them in a securely fenced paddock and dip within 60 days of shearing. Within 30 days of dipping, returns are to be made to the Chief Inspector of Stock.

Penalties are prescribed for persons exposing on public roads, highways or sale yards sheep infested with " ticks " or lice. The act does not prescribe what dip shall be used, but if sheep are found infested with " ticks " or lice the owner is held responsible. The remainder of the paper comprises practical suggestions for dipping. Diagrammatic sketches of the dip pens and dip are given.

II. In a general article on the subject the author states that eradication is considerably hampered by the large amount of inefficient dipping ; common faults in dipping are insufficient concentration of the dip and exposure of sheep to the dip.

The desirability for research into the efficiency of dips and of their effects on the parasites and sheep is stressed. The author believes that the margin of efficiency of the dip is lowered by the attempt of manufacturers to render their dips fly-repellant in summer and to raise their proofing power in winter by increasing the grease content.

III. The author defines sheep scab and points out that there is only one species of mite concerned—the psoropt. An annual decrease in the number of outbreaks of scab is shown—746 outbreaks in 1928, 666 in 1929 and 478 in 1930.

It is suggested that sheep in the preclinical stage may be passed through

landing places and if there is spread from this source stronger measures could be enforced at the ports. The 300 approved dips are shown to consist of 216 containing tar acids, 81 that are arsenical and 3 sulphide [presumably polysulphide such as "lime-sulphur"]. These are retailed under 1,038 titles and names. The author emphasizes that the countries which have controlled sheep scab have limited the approved dips to about three or four.

Of 63 approved dips sampled, 11 per cent. proved unsatisfactory when examined by the government chemist. If a similar state of affairs is general, then about 11 per cent. of dipping operations would be unsatisfactory.

Chemical examination alone is considered as unreliable in estimating the acaricidal power of all dips.

The author demonstrated live psoropts in scrapings from sheep which had been dipped twice under supervision a few weeks previously. Reinfection was considered unlikely so the dip or its method of application were suspected.

The difficulties of control on rough hill land are appreciated and fencing with quarter posts and three strands of wire is recommended.

Finally the author suggests that a small, suitably composed committee could soon draw up a scheme of the greatest value to the sheep industry and central authority.—J. S. Steward.

Stewart, M. A. (1932). **Dispersal of the Sticktight Flea of Hens (*Echidnophaga gallinacea* Westw.)**—*J. Econ. Entomol.* **25.** 164-167.

The sticktight flea is a fairly common cause of losses in young chickens and in egg production in the southern parts of the United States. The author considers its distribution and mentions the English sparrow and certain types of blackbirds and quails as the known dispersal hosts of this parasite.—Norman Hole.

I. Nighbert, E. M. (1932). **Controlling Stomach Worms in Sheep and Lambs.**—*United States Dept. Agric. Leaflet.* No. 89. pp. 6. 5 figs.

II. Hardy, W. T., & Schmidt, H. (1932). **Stomach Worms in Sheep and Goats.**—*Texas Agric. Expt. Sta. Bull.* No. 448. pp. 16. 1 fig. [1 ref.]

I. This leaflet advocates regular dosing of sheep for the control of *Haemonchus contortus* with a 1 per cent. solution of copper sulphate at fortnightly intervals throughout the spring and summer in the warmer parts of the country and at monthly intervals in the colder parts. To make the treatment also effective for the removal of tapeworms, 1 oz. of a 40 per cent. solution of nicotine sulphate may be added to every 30 doses (1 oz. to each gallon of 1 per cent. copper sulphate).

Lambs which are born early and marketed early run comparatively little risk of contracting haemonchosis.

II. The second publication treats the same subject in much the same way, but a little more fully. It refers only to *Haemonchus contortus* and for treatment recommends dosing with 1·75 per cent. solution of copper sulphate alone, or with the addition of nicotine sulphate (in the form of Black Leaf 40), or with tetrachlorethylene. A flock of sheep at the experimental station has received the copper sulphate treatment at intervals of 30 days for 4 years without any untoward result, but it is considered that tetrachlorethylene is even safer where weak animals are to be treated. This bulletin also suggested that the lambs should be born early in the year and marketed before the end of the summer, at which season the disease is most likely to appear.—E. L. Taylor.

IMMUNITY.

MARRACK, J., & SMITH, F. C. (1932). **Quantitative Aspects of Immunity Reactions: the Combination of Antibodies with Simple Haptenes.**—*Brit. J. Exp. Path.* **13.** 394-402. 1 fig., 2 tables. [7 refs.]

It has previously been shown that the formation of a precipitate by a protein coupled with a specific group such as p-amino-benzene-arsonic acid (atoxyl) and the serum of a rabbit immunized with protein containing this specific group is inhibited by the presence of excess of substances containing the specific group. The object of this paper is to demonstrate that, even when no precipitate is formed, specific combination takes place, it being suggested that precipitation only follows the specific combination when the specific group is attached to a large molecule and some intramolecular change thus takes place. Since such haptenes, as the specified groupings may be called, pass through a collodion membrane and antibodies will not, the measurement by dialysis was used. The results indicate that direct combination between the haptenes prepared from p-amino-benzene-arsonic acid occurs specifically with the globulins of the homologous antiserum. The reaction was shown to be specific.—R. LOVELL.

I. DUNCAN, J. T. (1932). **The Relation of Optimal Agglutination to the Equivalent Serum-Suspension Ratio.**—*Brit. J. Exp. Path.* **13.** 498-502. 1 table. [7 refs.]

II. EAGLE, H. (1932). **Specific Agglutination and Precipitation. II. Velocity of the Reactions.**—*J. Immunol.* **23.** 153-186. 21 figs. [9 refs.]

I. In the serum-precipitin reaction two different antigen-serum ratios giving optimal flocculation can be found. RAMON [(1922). *C. R. Soc. Biol. Paris.* **86.** 711.] employed a method for the titration of diphtheria toxin in which falling doses of antibody were titrated against a constant dose of antigen, whilst DEAN and WEBB [(1926). *J. Path. & Bact.* **29.** 473.] titrated falling doses of antigen against a constant amount of antibody. Using bacterial suspensions and agglutinating sera, Duncan has shown that two similar types of optimal agglutinating ratios of serum to suspension may be demonstrated. By varying both serum and suspension dilutions it has been shown that these two ratios bear a constant relation to each other, the position of the RAMON optimal ratio having an excess of serum over the ratio of DEAN and WEBB. By titrating the supernatants of the system, it was shown that, of the two ratios, the DEAN and WEBB method approached more closely to the position of the equivalent antigen-antibody ratio. This may prove very useful in absorption tests with heterologous organisms especially where exact dosage in proportional absorption is essential for the determination of antigenic structures of closely allied bacteria.

II. The common factor involved in every type of antigen-antibody aggregation, whether bacterial, red cell, protein or lipoid, is considered to be the sensitization of antigen by a film of antibody globulin. The velocity of aggregation therefore rests largely on two factors, first the number of impacts between the sensitized particles and secondly the result of cohesion or the proportion of impacts which are effective. Shaking increases the number of impacts and accelerates aggregation; a decrease in total volume acts similarly by decreasing the average space between particles. An increase in the concentration of antibody increases the velocity by forming a more complete film of sensitizing antibody around the antigen particles. An optimum is reached after which further increase is relatively ineffective. Too few zones of inhibition of aggregation due to excess of antibody were met in the experiments for the author to make a study of this phenomenon. Up to a certain

optimal value an increase in the amount of antigen, in the electrolyte concentration and in temperature, accelerated the reactions. An excess of antigen retarded aggregation, this probably being due to the proportional decrease in sensitization of particles. The explanation of the effect of electrolytes is considered to be due to the reduction of the surface charge of the sensitized particles, it being effective to an optimal reduction, but the retardation at higher concentrations cannot as yet be adequately explained. No explanation is available for the effect of temperature upon the velocity of the reactions.—R. Lovell.

Thorp, F., Jr., & Graham, R. (1932). **An Urticaria-Like Syndrome Accompanied by Multiple Eosinophilic Granuloma of the Skin.**—*North Amer. Vet.* **13.** No. 3. 19-22. 8 figs.

This is the case of a mare, 10 years old, which showed multiple nodules on all or most parts of the body. The condition was first noticed by the attending veterinarian in 1930, but the case was not brought to the notice of the authors until August 1931 and then owing to the extent of the condition. A history of the case failed to bring to light any occurrence which might have been a factor in the cause. Sections of the nodules which were surgically removed showed in cross section what appeared to be circumscribed fibrous tissue embedded in the corium of the skin, yet the epidermis did not seem to be involved. Connective tissue cells in various stages of development, infiltrated areas of eosinophiles and mononuclear cells intermingled with the connective tissue were seen.

The attending veterinarian in a subsequent report to the authors stated that, following a " starvation " diet, recovery appears to have taken place and the mare is now in good working condition.—G. W. Dunkin.

Olitzki, L. (1932). **Electric Charge of Bacterial Antigens.**—*J. Immunol.* **22.** 251-256. 5 tables. [13 refs.]

It is shown by electrophoresis experiments that the H-antigen of *Proteus vulgaris* X19 carries a negative electric charge over a range of pH 12·0 to 4·4; the O-antigen carries a negative charge over a range of pH 12 0 to 3·4. Large amounts of pure O-antigen can be obtained at the positive pole by cataphoresis of whole bacteria at pH 4·0 whilst, if bacterial extracts be used at the same pH, it is possible to remove the O-antigen completely by this means, leaving pure H-antigen in the middle vessel of the apparatus.—W. R. Wooldridge.

I. Weinberg, M., Davesne, J., & Prévot, A. R. (1932). Recherches sur la standardisation des sérums antigangréneux. [**Studies on the Standardization of the Anti-Gas Gangrene Sera**].—*Ann. Inst. Pasteur.* **49.** 387-415.

II. Glenny, A. T., Barr, Mollie, Ross, Helen E., & Stevens, Muriel F. (1932). **The Influence of Avidity upon the Standardisation of Antitoxins.**—*J. Path. & Bact.* **35.** 495-508. 7 tables. [13 refs.]

I. The importance of a uniform procedure and a definite known standard for titrating the antitoxic sera of the gas gangrene group of organisms is emphasized. The necessity for using mice for carrying out such titrations is apparent. The authors give details of the standards which they adopt and the equivalent test dose for mice has been found where animals other than mice were used for titrating the sera.

II. The practical significance of non-avid examples of diphtheria, lamb dysentery and tetanus antitoxins is shown. A non-avid serum may affect the neutralizing power and, therefore, the apparent antitoxic value. The necessity for using good control sera for standard tests is pointed out. [The value of this

work to veterinarians is apparent and antitoxic sera for use in prophylaxis should only be obtained from reliable sources].—A. J. WILSDON.

BLOM, T. (1932). Den kurativa serumdosens storlek i förhållande till den skyddande serumdosen. [**The Curative as compared with the Therapeutic Dose of Serum**].—*Skand. Vet.-tidskr.* **22.** 104-110. 3 tables. [Summary in English : abst. from orig.]

The author tested the action of an anti-swine erysipelas serum and a strain of swine erysipelas culture on mice. The protection value of the one and the potency of the other were found to be satisfactory. Experiments were then conducted in which mice received varying doses of the serum and subsequent injections of culture whilst other mice received doses of culture followed by varying amounts of serum. A third group of mice acting as controls received culture injections only. The results, which are tabulated in detail, demonstrate that (a) the curative dose of serum should be at least twice as large as the minimum prophylactic dose and (b) serum injected very soon after infection as a curative measure is as efficacious as a prophylactic injection, provided that the dosage is increased proportionately. —G. B. BROOK.

DISEASES, GENERAL.

I. SCHMIDT, W. (1932). Die planmässige Bekämpfung der Unfruchtbarkeit der Rinder in Mecklenburg und die klinische Frühdiagnose der Trächtigkeit des Rindes. [**The Systematic Combating of Sterility in Cattle in Mecklenburg and the Early Clinical Diagnosis of Pregnancy**].—*Tierärztl. Rdsch.* **38.** 825-828 and 845-847.

II. ZWICKY, H. (1932). Die Massnahmen des Züchters zur Bekämpfung der nichtinfectiösen Unfruchtbarkeit des Rindes. [**Measures taken by Breeders to control Non-Infectious Sterility of Cattle**].—*Schweiz. Arch. Tierhlk.* **74.** 399-416.

III. HETZEL, E. (1932). Prolan—Eine neue Methode der sterilitätsbehandlung. [**Prolan—A New Method of treating Sterility**].—*Vet.-med. Nachricht.* **1.** 1-4.

I. The course of development of the bovine foetus is traced from conception through the first three months of pregnancy. By the fourth week a diagnosis of " probably pregnant " is possible, but anything more definite should be avoided. The factors at this stage are the sealing of the os uteri, dryness of the vaginal mucosa, a " springy " feel of the uterine wall on palpation *per rectum*, possibly fluctuation of the amniotic fluid and a corpus luteum in one of the ovaries. At this period the foetus is too small to be recognizable.

By the seventh week a reasonably reliable diagnosis should be possible based upon the above factors. [The author does not mention palpation of the uterine artery for the characteristic pulsation of pregnancy described by QUINLAN and others.]

The point is stressed that any of the above factors may be indications of disease as well as of pregnancy. A decision must be based upon the summation of evidence and not upon an isolated symptom.

Cases of sterility were treated by irrigation through a curved uterine catheter with Lugol's solution or dijozol. A syringe was used for introducing the fluid. Of 1,151 apparently sterile animals treated in this way, 75 per cent. subsequently became pregnant.

II. This article takes the form of a discourse upon the subject. The author

attempts to define normal fertility and then describes the physical and physiological requirements of the individual which achieves this normal degree.

From the breeders' point of view, sterility is a problem concerning the female rather than the male.

Considering various factors associated with sterility, the subject of twins is discussed. 47 per cent. of twins are said to be dissimilar. Of these dissimilar twins the female partner is always sterile. The percentage of twins born varies from breed to breed between the limits of 1·8 and 3·4 per cent. The possibility of twin production being hereditary is raised, a case being quoted of a sire having 101 daughters, 24 of which bore twins.

Over-domestication leads to a decrease in fertility due to loss of "constitution" and to other factors which are not understood. Breeding for certain anatomical features regardless of constitutional factors, breeding for high milk yield only and excessive " in-breeding " all lead to a lowered calf production.

The influence of feeding methods is discussed. A suitable, balanced ration varying with the degree of pregnancy is desirable, and at all times a very high carbohydrate ration should be avoided. Sufficient mineral salts, particularly phosphorus and calcium, are necessary. The significance of vitamin D receives attention.

Other factors of importance to sterility are, in the male, arrested development of the genitalia, malformations causing painful service, premature ejaculation and general febrile diseases ; and in the female, cystic degeneration of the ovary, retention of the corpus luteum, trauma, poisons and febrile disease.

Methods of control of sterility must be aimed at dealing with the above points.

III. Prolan is a preparation of pituitary body which is claimed to contain the anterior lobe secretion in an active form. It is said that up to 90 per cent. of cows treated with injections of this preparation subsequently became pregnant, but no experiments supporting this statement are described. Prolan may also be used for mares and sows. Dosage is standardized by taking as a unit the amount necessary to promote heat in young female rats within five to six days after injection.

—E. J. Pullinger.

Cuillé, J., & Chelle, P. (1932). Contribution à l'étude de la stérilité chez la vache. [**A Contribution to the Study of Sterility in the Cow**].—*Rev. gén. Méd. vét.* **41.** 525-581. 5 figs. [26 refs.]

This article takes the form of a critical review of the work done upon this subject and contains no experimental material.

The causes of sterility are grouped as disorders of the vagina, uterus, fallopian tubes and ovaries.

The vagina may show malformations or may be inflamed. Contagious granular vaginitis is the most common cause of the latter condition. The authors agree with Quinlan that it is only during its acute stage that this disease interferes with fertility.

The uterus shows chronic endometritis resulting usually from retained foetal membranes or from infection gaining entrance during difficult parturition. Brucella infection is not considered important except in so far as abortion is frequently followed by retention of the foetal membranes.

The fallopian tubes show inflammation of a descending tuberculous type or an ascending type following metritis. The tubes form an excellent pabulum where micro-organisms can thrive. In addition to natural causes, salpingitis often results from badly performed uterine irrigation.

The authors incline to the view that the uterus is generally the primary seat of genital disease and that salpingitis and ovarian disorders are sequelae. The two common ovarian disorders are persistent corpus luteum and cystic degeneration. The cause is not clear in either case. There is no convincing evidence in favour of an infective aetiology. Cysts have been explained as abnormally developed Graffian follicles, but the probable explanation of both conditions is an upset of endocrine balance between the ovary and the anterior lobe of the pituitary body. Treatments of sterility consisting of irritation or massage of the genital tract aim at stimulating the parasympathetic system and through it the hormone secretion of the pituitary body. Such forms of treatment are claimed to have achieved considerable success.

A technique is described for a complete clinical examination of the genital tract. The procedure does not differ materially from that advocated by QUINLAN and by WILLIAMS.

In the treatment of contagious granular vaginitis, irrigation should be avoided and treatment should aim at allaying pain and inflammation. Metritis responds to irrigation preferably with iodine preparations. A technique for enucleating persistent corpora lutea by pressure *per rectum* and puncturing cysts *per vaginam* is given.

The influence of diet upon sterility is discussed including the question of vitamin deficiency, the present day conceptions of the role played by vitamins D and E receiving attention.—E. J. PULLINGER.

CHRISTNACH. (1932). Beurteilung der Hodentransplantation bei nymphomanen Stuten. [**A Critical Examination of the Operation of Testicle Grafting for the Relief of Nymphomania in Mares**].—*Zschr. Veterinärk.* **44.** 353-361. 1 table. [3 refs.]

A further series of attempts to relieve nymphomania in 22 mares by grafting portions of testicle into the neck are described. Although there were no untoward sequelae, the operation is considered to be without beneficial effect. The lack of success is attributed, possibly, to the fact that the blood groups of donors and recipients were not determined. According to POLOZOW, close consanguinuity is essential to the success of the operation.—A. A. PRYER.

I. GRIFFITHS, H. W. (1932). **Specific Canine Hysteria.**—*Vet. Rec.* **12.** 1332-1334.
II. WILKINSON, D. E. (1932). **The Aetiology of "Canine Hysteria."**—*Ibid.* 1376-1377.

I. A good description of the disease affecting particularly sporting dogs in Great Britain, in which there are periodical attacks of great fright causing the dog to howl and bolt for any convenient shelter. In America it is called "fright disease." Although no published results of proper research work into the condition are available, it has often been observed that the disease has some association with certain dog biscuit foods.

The paper is followed by a discussion at which experiences were aired.

II. Wilkinson states his belief that canine hysteria is a virus disease. At the *post-mortem* examination of five cases, a passive congestion of the brain was found.—J. E.

ROSSI. (1932). La maladie de la peur chez le chien, "Fright disease." [**Canine Hysteria**].—*Bull. Acad. vét. France.* **5.** 211-213.

This article summarizes already published facts regarding the incidence, symptomatology and control of canine hysteria.

The usual theories as to its cause are discussed, but no fresh light is shed on its undetermined aetiology.—A. A. Pryer.

Levy, A. G. (1933). **The Pathological Action of Light: III. "Light Stroke" and Its Relation to "Heat Stroke."**—*J. Path. & Bact.* **36.** 31-39. 5 tables. [14 refs.]

Light.—The author found that prolonged irradiation of depilated white mice with cooled ultra-violet light was not lethal nor were the mice sensitized to heat by it. Its traumatic effect may possibly be due to capillary stasis, the formation of a histamine-like substance being of a reparatory nature. The superficial effect of visible light on mice whose skins have been sensitized with haematoporphyrin (iron-free haematin) is essentially the same as that produced by ultra-violet radiation, except that the white light penetrates the deeper structures of the skin and produces a final syndrome which cannot be differentiated from heat stroke. This type of irradiation will produce no apparent effect in mice after exposure for three quarters of an hour, but they will be found to die within 24 hours and more rapidly if subsequently exposed to heat.

Heat.—Mice exposed to radiant heat from an electric heating coil die more quickly (47 minutes) and at a lower temperature (35°C.) than mice subjected to heat in an incubator. In the case of mice sensitized with haematoporphyrin and heated, no evidence was found that they were sensitized by heat to visible light.

Insolation.—Mention is made of the work of Aron and also of Marsh, who found that the shaved heads of animals could be exposed to the tropical sun provided that their bodies were kept cool. It is stated that "any connection between light sensitization and heat stroke can be ruled out of the question in the absence of any recorded clinical observations of this nature."—Edward F. Peck.

Thomas, L. J., & Cahn, A. R. (1932). **A New Disease in Moose. Preliminary Report.**—*J. Parasitol.* **18.** 219-231. 2 figs., 2 plates. [10 refs.]

The authors have written this paper as a preliminary report of their work on a disease which affects moose in Northern Minnesota and in Ontario. The disease is seasonal in incidence, cases developing in the late winter and early spring, usually between February and May. Affected animals show blindness; they may wander aimlessly or stagger into obstacles. The disease does not always end fatally, but most animals in the later stages of the disease become weakened and anaemic and exhibit some form of paralysis of the limbs. On *post-mortem* examination the liver was found to be engorged and the spleen reduced in size and bloodless. The authors, who suspected the tick—*Dermacentor albipictis*, present on all affected animals -to be the transmitter of the disease, carried out infestation experiments on guinea pigs, rabbits, a bull calf and a lamb and they were able to reproduce in guinea pigs and rabbits a condition which was similar in detail to that shown by affected moose. Positive results were obtained with both adult males and adult females collected from affected moose, but not with nymphal females. Blood films and liver and spleen smears have been stained and characteristic blue bodies and red bodies have been found in the erythrocytes. In the blood films, red staining bodies were found free in the plasma. The authors were able to isolate an organism from female ticks which had engorged on affected moose. This organism was capable of reproducing the typical disease in guinea pigs and rabbits after intravenous injection. The nature and biological characters of the organism are not given.—D. R. Wilson.

Uhlenhuth, P., Miessner, H., & Geiger, W. (1933). Züchtung seuchenfester

Schweinerassen. [**Breeding Disease-Resistant Strains of Pigs**].—*Deuts. tierärztl. Wschr.* **41.** 49-51.

As pigs of the Mangalitza breed have been considered to be resistant to swine fever, the authors attempted to produce a strain of pigs resistant to swine fever by crossing Mangalitza boars with Berkshire and nondescript sows. When tests were carried out on the progeny of such crosses against natural and artificial infections of swine fever no significant increase of resistance over that of the control animals was demonstrated. The experiments were carried out upon very small groups of animals.—E. J. Pullinger.

Chamberlain, W. E. (1933). **The Blood Picture in Acute Cases of Enzootic Toxaemic Jaundice in Sheep.**—*Austral. Vet. J.* **9.** 2-9. 1 fig., 3 tables, 1 graph. [6 refs.]

In the type of jaundice dealt with the symptoms were those of anaemia, icterus and haemoglobinuria accompanied by pyrexia, anorexia and depression.

Red Cells.—These were reduced by about 75 per cent. and they showed anisocytosis, achromasia and polychromasia and, rarely, punctate basophilia. Megaloblasts and numerous normoblasts were not uncommon. Jolly bodies were often observed, one or more being seen in a single cell, and the author subscribes to the view that these bodies are the remnants of the degenerating nuclei of normoblasts.

White Cells.—A leucocytosis was attributed to the effects of intestinal stasis. Polynuclear leucocytes increased both absolutely and relatively with many young and immature forms. Irregular eosinophilia was encountered in both healthy and diseased sheep.

Platelets.—These showed an increase in numbers and a great diversity of morphology, some having flagellate-like forms.

The paper concludes with a number of differential diagnoses of the various anaemias by means of their blood pictures, and from a study of the blood picture it is hoped to discover the stimulus which has produced the changes described.

—Edward F. Peck.

I. Cole, C. G. (1932). **Leucocyte Counts on the Blood of Normal, Cholera-Infected and Recently Immunized Pigs.**—*J. Amer. Vet. Med. Ass.* **81.** 392-400. 4 tables. [3 refs.]

II. Craft, W. A., & Moe, L. H. (1932). **Statistical Observations involving Weight, Hemoglobin and the Proportion of White Blood Cells in Pigs.**—*Ibid.* 405-407. 2 tables. [1 ref.]

III. —. (1932). **Leucocyte Variations in Health.**—*Brit. Med. J.* Oct. 1st. 642.

IV. Grimard-Richard, L. (1932). Réactions leucocytaires et migrations des leucocytes à travers le placenta du Cobaye. [**Leucocyte Reactions and the Migrations of Leucocytes through the Placenta of the Guinea Pig**].—*C. R. Soc. Biol. Paris.* **111.** 777-779. [1 ref.]

I. In this paper, the author states that the leucocyte count of normal pigs is subject to considerable variation. He found the average to be 20,000 per c.mm.

In swine fever pigs he found leucopenia to be a common though not a constant feature of the disease. A transitory leucopenia is also present in all pigs immunized by the simultaneous method.

II. This report contains data relative to weight, haemoglobin content and differential leucocytic counts in nine litters of pigs which the authors had under observation for other purposes. The pigs were examined at birth and thereafter at intervals of 30 days. A table is included in which weight and the various blood constituents have been correlated.

III. This short article refers to the doubt which has been thrown on there being a true digestive leucocytosis. It is pointed out that muscular exercise is accompanied by an increased number of leucocytes in the blood and it is suggested that by paying insufficient attention to this point observers have been led to believe in a digestive leucocytosis.

IV. In this note, the author gives his observations on materno-foetal leucocytic migrations and states that maternal leucocytes, which do not normally appear to traverse the placenta in the pregnant female, can be found in the foetal tissues when degenerative lesions are present in the placental ectoderm.

—Gwilym O. Davies.

Akerblom, E. (1932). Till kannedomen om fangens etiologi. [**The Aetiology of Laminitis**].—*Svensk Vet.-tidskr.* **37.** 77-83.

Experiments have been made to find the aetiological factors of the laminitis in horses which follows the feeding of large quantities of rye and barley. Boiled rye causes no symptoms while small quantities of the untreated grain fed over a long period give a tolerance. Aqueous and alcoholic extracts of rye when injected caused no symptoms, but the residual grain when dried and fed to other horses caused laminitis. Parasitic fungi on rye were both fed and injected, but without effect. Histamine, which may be normally formed in the bowel by coliform organisms, when injected, gave rise to severe systemic symptoms very similar to those seen in laminitis, but with only a small reaction in the feet. Further experiments are being carried out with other substances of a similar nature.

The cause is thought to be an intoxication, either from toxic substances in the food or digestion products, but no definite conclusion has so far been reached.

—A. A. Forsyth.

Brandenburg, T. O. (1932). **Paralysis of Pregnant Ewes.** [**Pregnancy Disease**].—*Cornell Vet.* **22.** 275-276.

This is a brief description of the condition commonly called pregnancy disease in the British Empire.—J. E.

Wilson, L. T., & Hart, E. B. (1932). **The Chemistry of the Blood of Dairy Cows before and after Parturition and its Relation to Milk Fever.**—*J. Dairy Sci.* **15.** 116-131. 9 tables. [24 refs.]

Blood analyses were made on a number of cows both before and after normal calving. The results are compared with a smaller number of observations made on cows suffering from milk fever. Some variations were found in the blood protein values, but these were not consistent and comparison with one analysis of a milk fever subject suggests that anhydraemia is not an important factor in milk fever. In normal calving there is a tendency for the blood inorganic calcium to fall slightly, but this variation is much greater in milk fever and the value rises again on udder inflation. No instance of hypercalcaemia was observed after udder inflation [see Dryerre & Greig. (1928). *Vet. Rec.* **8.** 721]. Inorganic phosphorus values show a very slight tendency to fall at or soon after calving. [These phosphorus results are very variable]. At calving time the phosphatase content of blood is usually high. The content of this enzyme in milk is usually much higher than that of the plasma, a fact which suggests that the enzyme may occur in the udder tissues and not appear in the milk entirely as the result of simple diffusion from the blood.—W. R. Wooldridge.

Greig, J. R., Dryerre, H., Godden, W., Crichton, A., & Ogg, W. G. (1933).

Pine: A Disease affecting Sheep and Young Cattle.—*Vet. J.* **89.** 99-110. 3 figs., 6 tables. [15 refs.]

The condition of pine (" pining," " vinquish," or " daising ") in sheep and cattle was studied as it occurs in Tiree (a small island of the Inner Hebrides) of which a descriptive map shows the pining areas of blown sand. The disease is regarded as analogous to the " bush-sickness " of New Zealand, " nakurutis " of Kenya and " salt-sick " of Florida [see this *Bulletin*. **1.** 314, and **3.** 41.] and it was concluded that the cause of pine is a deficiency of iron in the pasture and/or of available iron in the soil.

Affected pastures were frequently low in phosphorus. Iron could not be reliably determined in pasture samples owing to contamination with soil dust, but the available iron in affected soils was low as measured by solubility in 5 per cent. oxalic acid.

The experimental animals consisted of 21 young island cattle divided into three groups, one receiving salt and ferric oxide at the rate of 1 oz. of each per head per day, a second receiving an additional 1 oz. of dicalcium phosphate, and the third serving as control. The iron oxide, with or without the phosphate, appeared to be of specific curative and preventive value. Two photographs serve to show the response to iron treatment. Haemoglobin determinations on the blood of pining cattle showed an apparent anaemia (about 85 per cent. of normal) but, curiously enough, the figure did not rise as physical condition improved under the relatively massive iron supplement of 1 oz. ferric oxide daily for three months. A speculative explanation for this is offered.—H. H. Green.

Malkani, P. G. (1933). **Kumri.**—*Ind. Vet. J.* **9.** 184-192.

Kumri is a disease of horses in the north-eastern provinces of India and in Burma. In the article, symptoms are described in detail. The disease is seasonal and regional in distribution. It is more prevalent in imported animals. A critical survey is given of previous views upon aetiology. Specific organisms have not been found, artificial inoculation has not reproduced the disease, climate plays only a secondary part and vegetable poisons may be ruled out for the reasons given. Association of ocular filariasis with kumri may also be ruled out and one reason given by the author is that " filariasis is very common in the Punjab, but kumri is rare."

The author advances the theory that kumri is caused by schistosomes (probably *S. indicum*) and considers that this " explains most satisfactorily all the features of the disease." The principal reason for the author's conclusion is that he has found these parasites in all affected cases which he destroyed for examination. On the strength of his theory, Malkani strongly recommends tartar emetic treatment. [The author, in advancing this theory, seems to have overlooked one of his own arguments against filaria as a causal factor, since schistosomes are common in horses in parts of the Punjab and United Provinces where kumri is unknown]. —S. H. Gaiger.

Radeff, T. (1932). Die physiologische Anaemie der Saugferkel und Eisenzugabe in der Saugperiode. [**Physiological Anaemia of the Suckling Pig and Iron Supplement during the Suckling Period**].—*Wien. tierärztl. Mschr.* **19.** 712-715. 1 table. [6 refs.]

Experiments were carried out to show that the addition of iron salts raised the haemoglobin content of the blood of the young pig during the suckling period, ferrous sulphate being useful in this respect.—J. R. M. Innes.

Wester, J. (1932). Mangelkrankheiten bei Haustieren, veranlasst durch Mangel an Mineralstoffen. [**Mineral Deficiency Diseases in Domesticated Animals**]. —*Arch. wiss. prakt. Tierhlk.* **65.** 490-521. [40 refs.]

A review article, the contents of which may be indicated as follows :—

(1) Goitre in dogs, sheep, cattle and pigs, in relation to iodine deficiency. The author concludes that disturbance of iodine metabolism is often a predisposing factor but that the real cause often lies elsewhere. [15 refs.]

(2) Rickets, osteomalacia, osteofibrosis. The author does not distinguish clearly between osteomalacia and so-called osteoporosis [compare Theiler—this *Bulletin.* **3.** 39.] but distinguishes osteofibrosis, which he also terms " osteomalacia metaplastica," from both. He discusses the bearing of deficiencies of calcium, phosphorus, and vitamin D, and the significance of infections ; and considers that direct mineral deficiency often plays a smaller rôle than indirect causes in the aetiology of bovine osteomalacia. [7 refs. the most important literature on bovine osteomalacia and equine osteofibrosis being overlooked].

(3) Pica and emaciation. The author distinguishes between pica due to aphosphorosis and pica due to other causes. The aetiology of " lecksucht " or " moorboden pica " [a form of perverted appetite, usually associated with cachexia, chiefly shown by cattle, and common on certain moor soils and reclaimed bogs] is treated as still obscure, but as probably explicable on grounds of mineral imbalance and insufficient protein in the herbage. It is regarded as remediable by land drainage, soil amelioration and cultivation. [11 refs.]

(4) Mineral metabolism in relation to nervous disorders. Eclampsia puerperalis of dogs, grass tetany [lactation tetany] of cows, milk fever, and the disturbances following excess consumption of the leaves of root crops, are discussed. [7 refs.]

(5) Anaemia. " Bush sickness " of New Zealand, " pining " of Scotland [see this *Bulletin.* **3.** 374 and 429.] and nutritional anaemia of pigs, are discussed in relation to deficiency of iron and therapeutic significance of copper. [5 refs.]

(6) Sterility. The author does not attach much importance to the relationship between mineral deficiencies and sterility of domesticated animals [but has omitted the most significant literature on this point—compare the references given by Theiler. (1933). *Schweiz. Arch. Tierhlk.* **75.** 47]. [5 refs.]—H. H. Green.

Bethke, R. M. (1933). **Types of Leg Disorders Affecting Growing Chicks.**—*J. Amer. Vet. Med. Ass.* **82.** 476-480.

The author mentions four types of leg weakness in young chicks, all of which appear to be caused by nutritional errors. Rickets is due to a deficiency of vitamin D or calcium and phosphorus ; " hock " disease is probably caused by an excess of phosphorus and nutritional paralysis is probably associated with vitamin G. The cause of " crazy " chicks is not known, but appears to be a diet factor. All these conditions affect chicks from four to five weeks old, but the author points out that he has met with true fowl paralysis in chicks only five weeks old ; differential diagnosis of any of these conditions is sometimes difficult.—Norman Hole.

I. Zimmerman, H. M. (1933). **Lesions of the Nervous System in Vitamin Deficiency. I. Rats on a Diet Low in Vitamin A.**—*J. Exp. Med.* **57.** 215-228. 10 figs. on 4 plates. [11 refs.]

II. Wolbach, S. B., & Howe, P. R. (1933). **Epithelial Repair in Recovery from Vitamin A Deficiency.**—*Ibid.* 511-526. 9 figs. on 3 plates, 2 tables. [14 refs.]

I. Twenty-three animals were used, the clinical manifestations were noted and then the central and peripheral nervous systems were examined microscopically.

Alternative methods of staining were adopted so as to control the histological examinations. All animals on a diet deficient in vitamin A developed paralysis. Histologically, degeneration was found in the posterior nerve roots and the ascending tracts and less frequently in the descending tracts and the anterior roots. Degenerative changes were found in the vagi and sciatic nerves, but not in the optic nerves. Some animals, after showing paralysis, were given cod liver oil. The clinical symptoms improved, but there was no significant change in the histological picture. Inanition, provided vitamins are administered, does not result in paralysis or nerve degeneration.

II. The changes were studied upon 72 rats. Absence of vitamin A causes proliferation of basal cells of the epithelium, giving rise to keratinizing stratified epithelium in every site affected. The salivary glands are the first to be involved, the conjunctivae being affected at a comparatively late stage. There is no increase in the susceptibility to infection. When vitamin A is administered, the phenomena of recovery are common to all locations. These consist in a differentiation of the basal cells to that type of epithelium peculiar to the locality. These new cells become an independent tissue and do not then contribute to the nourishment of the overlying stratified epithelium. This is then probably removed by a process analogous to an inflammatory response to a foreign body. In all probability vitamin A deficiency, such as to bring about these changes, does not occur in animals under natural conditions. A somewhat similar mechanism, however, seems to function in the vaginae of rodents during the oestrus cycle.

—Henry Dryerre.

PUBLIC HEALTH.

Lovell, R. (1932). **The Relation of Meat and Meat Products to Bacterial Food Poisoning in Man.**—*Vet. Rec.* **12.** 1052-1065. 4 tables. [40 refs.]

Readers may be referred to this article as a concise review of the subject, with particular reference to bacterial food poisoning due to salmonella, which are believed to account for about 70 per cent. of outbreaks. The serological characters of these organisms and their disease-producing rôle in animals and in man are summarized in tabular form. [For further details of their antigenic structure see Lovell, this *Bulletin*. **3.** 233]. This is followed by a discussion of the methods by which infection of food with these bacteria occurs and of the types of salmonella which have been isolated from cattle, swine, sheep and poultry. A large number of cases are due to contamination of food during its preparation and the danger from rodents, particularly if bacterial " poisons " claimed to be virulent only for the rat have been used to fight them, and possibly from dogs is emphasized. In a number of instances infection has, however, been traced to the food animal itself, and tables are given to show that the emergency slaughtered animal is the prime danger. Many members of the salmonella group have been isolated from diseased animals, a finding which supports the case for *ante-mortem* inspection of food animals. Eggs, particularly ducks eggs, may on occasion be not without danger to human beings.

Reference is also made to food poisoning due to the preformed toxin of *Clostridium botulinum*, staphylococci, or, occasionally, comparatively harmless bacteria if present in sufficient numbers.—A. W. Stableforth.

Barnicoat, C. R. (1932). **Quick Freezing.**—*New Zealand J. Sci. & Tech.* **13.** 371-376. 1 table.

It has long been known that the ideal method of preserving meat is to freeze it as quickly as possible and to thaw it slowly in order to prevent drip and so retain the valuable juices. For some years so-called methods of quick freezing have been under test. The author reviews these methods and their effects upon various food-stuffs including beef, mutton, fish and fruits. Reference is made as to the carton system of packing and quick-freezing meat by which all unnecessary fat and bones are retained and utilized in the packing plants. The contents of the cartons are very attractive and the cost of transport is very much reduced. It is shown by a price list table that the improved method of packing and handling enhances the selling value of the food to an almost unbelievable extent. The author has not emphasized an important feature of quick-freezing, i.e. the article of food, chop, steak, etc., can be cooked in the frozen state without any preliminary thawing and retains its flavour in addition to being tender.

There is little doubt that, in the future, the packing of meat in cartons and the quick freezing of imported food are to play an important part in transportation of overseas shipment. At present only small goods can be so dealt with, e.g. meat up to five inches in thickness. It will take some time to educate the public to this class of meat supply, but there is no doubt that, from a hygienic point of view, it is a decided improvement. It will, however, make us more and more dependent upon reliable meat inspection at the places of origin.—T. Dunlop Young.

Douglas, S. R. (1932). **Milk-Borne Diseases.**—*Brit. Med. J.* July 30th. 198-200. [Paper presented at the Centenary Meeting of the British Medical Association, 1932].

This paper is a brief account of some of the diseases communicable to man through the drinking of raw milk. They are divided into two classes :—(a) those in which the milk becomes contaminated with pathogenic organisms after withdrawal from the cow, e.g. the typhoid and the paratyphoid group of fevers, some epidemics of streptococcus and staphylococcus sore throats, and perhaps scarlet fever ; (b) those the causative organism of which actually infects the cow and is excreted in the milk.

In the case of the first group of diseases, the milk merely acts as a suitable medium for the development of organisms and for their wide dissemination. Amongst the second group, the most important disease is tuberculosis which is estimated to be present clinically in the udder of 0·2 per cent. of milking cows, while 7 per cent. of market milk samples may show tubercle bacilli. Tuberculosis of bovine origin in man is more common in early life and is frequently found responsible for lesions in the skin, cervical glands, bones and joints, but is hardly ever found in the lungs. It is estimated that in England and Wales there are 4,000 fresh cases of infection with bovine tubercle bacilli every year and some 2,000 deaths annually.

Another disease considered is undulant fever, which it is now recognized may be caused by the ingestion of milk containing *Br. abortus* from cattle affected with Bang's disease. In view of the small number of undulant fever cases reported, it must be accepted that *Br. abortus* has very little power of infecting man, but it is possible that cattle may become infected with porcine varieties, which are more virulent.

The relationship of mastitis in cattle to human epidemics of sore throat is discussed.

The streptococci usually causing mastitis are non-pathogenic to man, but cases have been reported where the strains isolated were similar to the *Str. pyogenes*

group. Evidence is now accumulating that milk containing such streptococci may cause epidemics of sore throat.

With regard to the prevention of these diseases, much can be done in the case of tuberculosis by eradicating animals reacting to the tuberculin test and in the case of undulant fever by the elimination of cattle found infected with Bang's disease by the agglutination test. In the meantime, the pasteurization of milk is widely used, but the process is objected to on the ground that it may destroy some of the food value of the milk.—S. J. Edwards.

Archibald, R. E., & Feemster, R. F. (1932). **A Small Milk-Borne Outbreak of Septic Sore Throat.**—*New England J. Med.* **206.** 1252-1254. 2 tables.

An outbreak of septic sore throat was definitely traced to the milk of a single cow; 20 out of 23 persons (87 per cent.) who drank the milk raw were affected and three deaths occurred. Haemolytic streptococci were cultivated from the throats of 15 cases, from the throat of the milker, who died early in the outbreak, and from one quarter of the cow itself which was affected with mastitis. None of 16 other members of the affected families who did not drink raw milk were affected, and no cases occurred in persons supplied from other sources.—A. W. Stableforth.

Simpson, R. (1932). **Clinical Examination of the Cow's Udder.**—*Vet. Rec.* **12.** 1181-1199. [6 refs.]

The author points out the increasing need for a careful clinical examination of dairy cows brought about by the public demand for its protection from milk-borne diseases. In Scotland the clinical examination of cows is compulsory, whereas in England it is permissive and thus is much less satisfactory. Success demands careful and accurate work which is becoming recognized as a special branch of veterinary practice.

The methods of examination are described in detail and great stress is laid on tuberculous mastitis and its means of diagnosis. The importance and absolute necessity for microscopic examination of milk samples from irregular and diseased udders is emphasized and it is pointed out that the clinician should carry out his own microscopic examinations which, in the case of tuberculosis of the udder, should reach more than 90 per cent. of successes in positive cases, thereby greatly reducing the need for the biological test.

The various conditions encountered in cows' udders are described, prominence being given to the difficulties occurring in the case of cows with oedema of the udder which so frequently follows parturition.

The possibility of an intermittent excretion of tubercle bacilli from the udder is discussed and the occurrence of a pre-clinical stage when tubercle bacilli are eliminated with no clinical evidence of the disease is mentioned.

T. Wilson, who opened the discussion, dealt largely with non-tuberculous mastitis of an acute and chronic nature in its various forms along with general signs of disease in the cow.—D. S. Rabagliati.

Schern, K. (1932). Zur Untersuchung von Laue über die Brauchbarkeit der Labhemmprobe. **[Laue's Experiments on the Utility of the Rennet Inhibitory Test].**—*Berl. tierärztl. Wschr.* **48.** 234-236.

The author discusses Laue's report [(1931). *Zschr. Fleisch- u. Milchhyg.* **41.** 102.] on his experiments to test the usefulness of Schern's rennet inhibitory test for milk [for the diagnosis of mastitis and to ascertain the suitability of milk for the manufacture of dairy products]. Laue declared that the test took too much time and was inferior in diagnostic reliability to other laboratory tests. Schern

carefully examines his arguments and claims that LAUE has not properly understood the method and that his experiments have really shown the practical usefulness of the test, especially in those cases in which other tests—particularly LAUE's so-called " standard test "—completely failed and led him to imperfect diagnoses. Schern claims that his test is simple and practicable without being any more time-wasting than other tests and that it has proved itself in LAUE's own experiments to be an outstanding aid to diagnosis in cases of suspicious functional disturbances of secretions of the udder.—F. BULLOCK.

I. GEBHARDT, H. T., & SOMMER, H. H. (1932). **The Solubility of Metals in Milk. II. Submerged Corrosion Tests of Various Metals in Milk.**—*J. Dairy Sci.*. **15.** 42-61. 7 tables, 2 graphs. [34 refs.]

II. FINK, C. G., & ROHRMAN, F. A. (1932). **The Corrosion of Metals by Milk** —*Ibid.* 73-86. 2 tables. [35 refs.]

I. In these experiments a small weighed piece of metal was immersed in milk under defined conditions and its loss in weight measured. Precautions were taken to control the velocity of the milk at the metal surface, the gaseous content of the milk, temperature and the surface condition of the metal. It is shown that each metal must be examined individually. Generally increased acidity or increased oxygen content caused increased corrosion, but with some metals the effect was the reverse. A rise in temperature usually increased solution of the metal to a maximum, with a subsequent decrease, but with zinc and one or two other metals a minimum solubility was found within the temperature range of 20° to 97°C. Previous steam sterilization of the metal leads to pronounced increases in the corrosion of zinc and galvanized iron, a slight increase in the case of copper, a slight decrease with brass and a pronounced decrease with monel metal and nickel. The solution of Allegheny steel, stainless steel, aluminium and tinned copper is very slight in acid milk at room temperature, and in fresh milk at various temperatures and oxygen contents.

II. Milk in contact with nickel loses copper [milk generally contains about 0·5 parts per million of copper], this metal being precipitated out and the nickel going into solution. Nickel corrodes in milk more readily in the absence of oxygen, and copper in its presence. [In paper I above, nickel solubility was found generally to increase with the presence of oxygen]. High chromium nickel iron alloys, chromium plated copper and chromium plated nickel are very resistant to corrosion by milk and are recommended for dairy purposes.—W. R. WOOLDRIDGE.

I. MALCOLM, J. F. (1932). **The Plate Method of Estimating the Bacterial Content of Milk—the Limitations of Procedure in Common Use, with Suggested Improvements.**—*J. Dairy Res.* **4.** 91-104. 3 figs., 11 tables. [7 refs.]

II. HISCOX, E. R., HOY, W. A., LOMAX, K. L., & MATTICK, A. T. R. (1932). **The Bacteriological Examination of Milk. I. Modification of the Agar Plate-Count Method. II. The Use of the Methylene Blue Reductase Test at 15·5°C. as a Method of Determining the Keeping Quality of Milk.**— *Ibid.* 105-121. 9 tables, 6 charts. [5 refs.]

I. Omitting the 1 : 10 dilution and making the 1 : 100 by adding 1 c.c. of milk to 99 c.c. water, 0·1 c.c. of this being used for the 1 : 1,000 plate, counts as reliable as those given by the official method are obtained. For milks containing not more than 60,000 organisms per c.c. at least five parallel plates for the 1 : 100 dilution and two for the 1 : 1,000 must be used if the count is to be reliable. Counts in the neighbourhood of 100,000 require at least five plates for the 1 : 1,000 dilution.

Even with this number of plates there is a possibility of error and any milk failing to reach the standard should be retested.

II. Various substances were added to the official medium and the influence on the counts noted. Milk had the most pronounced effect, especially in counts of pasteurized milk. Extension of the incubation time beyond the standard also increases the count: the increase is not so great when the milk medium is used.

The findings are important in that a graded milk, if tested with this modified medium, may fail to reach the standard for its particular grade.

The reduction time of methylene blue in milk at 15·5°C. corresponds closely with the " period of sweetness " as determined by tasting.—GEORGE SLAVIN.

THERAPEUTICS.

MOIR, C., & DALE, H. H. (1932). **The Action of Ergot Preparations on the Puerperal Uterus.**—*Brit. Med. J.* June 18th. 1119-1122. 4 figs. [9 refs.]

Observations are recorded by Moir on human patients, using the technique of Bourne and Burn [(1927). *J. Obstet. & Gynaecol.* **34.** 249.] who studied the effects of oxytocic drugs administered during labour, by inserting into the uterus a sterile rubber bag connected to a manometer and recording drum.

The authors conclude that liquid extract and solid extract of ergot (B.P.), as also defatted ergot powder, show great activity in stimulating contractions of the puerperal uterus. The keeping qualities of the extracts are good but different samples of ergot vary in activity. Effects appear with remarkable suddenness, even within four minutes of oral administration. They are different from those of ergotoxine and ergotamine and there is reason to believe that the traditional effect of ergot is due to a substance as yet unidentified.

A supplementary note by Dale suggests that the observations open another important chapter in the complicated story of ergot and that the prospective new principle may prove to be as interesting as its predecessors.—H. H. GREEN.

BENESCH, F., & STEINMETZER, K. (1931 and 1932). Klinisch-experimentelle Untersuchungen uber die normale und medikamentell beeinflusste Uterusbewegung am lebenden Rind im Puerperium. [**Clinical and Experimental Research on the Normal and Drug-Influenced Movement of the Uterus in the Living Bovine at the Puerperium**].—*Wien tierärztl. Mschr.* **18.** 1-14, 65-70, 193-209, 577-592, 615-623 and **19.** 65-76. 42 figs., 4 tables. [Numerous refs.]

The work reported here is important in the fields of bovine physiology connected with parturition and practical obstetrics. Much modern research work is performed on cheap laboratory animals and on isolated living organs, and the results so obtained often give rise to unsound ideas when an attempt is made to adapt them to the large domestic animals. This is particularly the case in the field of sexual physiology.

The authors set out to study the uterine physiology, natural and drug-influenced, of the parous bovine, using a sensitive kymographic apparatus to record graphically the muscular activity of the uterus. [Available space only allows very brief reference to the individual experiments]. The normal involution of the uterus was first studied and was found to be practically complete by the fourth day *post partum*.

Secondly, the influence of epidural anaesthesia on uterine activity both before and after parturition was studied, with the result that it was found to have no such inhibitory influence.

Thirdly, the action of several ergot preparations, including simple extracts and special preparations, was studied : .no ecbolic action was found to be caused by any of them (although positive results have been obtained with the isolated bovine uterus).

Fourthly, the action of pituitary extracts was studied. Several preparations were tried with positive results, all having a strong stimulant action on the puerperal uterus : the best results are obtained when they are given epidurally. Finally, the ecbolic action of quinine was studied : it was found to be a good uterine tonic, having a slighter but longer-lasting effect than pituitary preparations. [These five sections are detailed papers in themselves with proper introductory reviews and separate reference lists are appended to each].—J. E.

I. DE MARQUEISSAC. (1932). Contribution à l'étude de l'emploi du 270 Fourneau (orsanine) dans le traitement de la trypanosomiase humaine. [**The Use of Fourneau 270 (Orsanine) in Human Trypanosomiasis**].—*Bull. Soc. Path. exot.* **25.** 252-260. 2 tables.

II. MURAZ, G., & VAISSEAU, G. (1932). De divers types d'arséno-résistance dans les traitements actuels (A.E.F.) de la Trypanosomiase humaine. [**Various Types of Arseno-Resistance in the Treatment of Human Trypanosomiasis in French Equatorial Africa.**—*Ibid.* 260-280.

I. The author quotes previously recorded favourable results in the treatment of human trypanosomiasis with orsanine, i.e. Fourneau 270 [sodium-4-acetylamino-2-hydroxyphenylarsinate], and discusses his own experience with 151 cases (127 previously untreated and 24 previously treated with tryparsamide or with atoxyl) in itinerant prophylactic practice. His records include data on weight of patient, general condition, meningeal reaction, sterilization of blood and effect on cerebrospinal fluid.

He considers that orsanine can be safely used in peripatetic treatment, that it is easily handled, is not painful when injected subcutaneously and is less liable to cause abscesses and puffiness than is tryparsamide. The wide margin between effective dose and toxic dose is regarded as specially valuable since the dosage of a course of treatment can be regulated according to the reactions to first injection. The therapeutic dose is given as 83 to 350 mg. per kg. and, although the author records one case of blood sterilization lasting for two months after cessation of 108 mg. dosage, he habitually gave from 150 to 350 mg. without compunction.

From the point of view of control, weekly injections continued over 49 days gave immediate sterilization in 96·7 per cent. of cases, of which 95 per cent. remained free from trypanosomes for two months after cessation of treatment.

II. Reference is also made in this paper to the relative merits of tryparsamide and orsanine but the actual data represent cases in which there was no adequate response to medication with arsenicals.

Of these the substitution of orsanine for tryparsamide was fatal in two cases ; inconstant results were shown with tryparsamide in 22 cases ; six cases were resistant to trypoxyl [the French brand of atoxyl] and seven cases suggested the evolution of arsenic-resistant trypanosomes after systematic treatment with trypoxyl at intervals over several years. Certain instances were included to illustrate the efficacy of relatively weak doses of trypoxyl alone, 13 cases showing normal cerebrospinal fluid and clean peripheral circulation several years later.

General deductions from the data were not possible, beyond emphasizing the need for keeping track of cases for a long time after apparent cure.—H. H. GREEN.

I. MACLEAN, G., & FAIRBAIRN, H. (1932). **Treatment of Rhodesian Sleeping**

Sickness with Bayer 205 and Tryparsamide : Observations on 719 Cases.—*Ann. Trop. Med. & Parasitol.* **26.** 157-189. 13 tables. [16 refs.]

II. Launoy, L., Nicolle, P., & Prieur, M. (1932). Etude de l'action synergique exercée par le 205 Bayer, 309 Fourneau et le 5 : 5′ arséno-2-thiolbenziminazol disodique, dans le traitement des infections expérimentales à " Trypanosoma Congolense " de la souris. [**Synergic Action of Disodium 5 : 5 Arseno-2-thiolbenziminazole combined with Bayer 205 or Fourneau 309, in the Treatment of Mice experimentally infected with** *T. congolense*].—*Bull. Soc. Path. exot.* **25.** 570-575. 5 tables. [2 refs.]

I. The 719 cases are analysed and it is shown that with adequate treatment with Bayer 205 (5 g. in 1 g. weekly doses) 73·5 per cent. may recover and remain well for over 29 months, provided treatment is begun within a month of onset of symptoms. Tryparsamide was less effective.

Combinations of Bayer 205 and tryparsamide were tried, using the drugs simultaneously or in sequence. There was no evidence that combined treatment is superior in ordinary cases but it is advised in late cases when prognosis is in doubt. Toxic effects of Bayer 205 were not significant but those of tryparsamide were more serious (blindness).

II. Working on mice the authors discuss the therapeutic index of the trivalent arsenical 5 : 5 arseno-2-thiolbenziminazole and its action in trypanosomal infections, alone and in combination with Fourneau 309 (i.e. Bayer 205).

They found that with mice of about 20 g. weight 1 mg. of the arsenical combined with 3 to 5 mg. of Fourneau 309 effected a sterilization of 80 to 100 per cent. in the case of *T. congolense* infections. Neither of these doses was effective alone. On keeping the quantity of 309 constant and reducing the dosage of arsenical, efficacy was found proportional to the latter. Conversely on keeping the arsenical constant the efficacy varied with the amount of the non-metallic urea derivative.

Since the combined effect of the two drugs was greater than the efficacy anticipated from simple summation effects of the doses given, the action is treated as " synergistic " [compare this *Bulletin.* **2.** 245].—H. H. Green.

Grzimek, B. (1931). Jodmilch gegen Kükenkokzidiose. [**The Treatment of Chicken Coccidiosis by Iodine in Milk**].—*Arch. Geflügelk.* **5.** 287-291. [10 refs.]

This paper deals with the iodine treatment of avian coccidiosis advocated by Kerr [see this *Bulletin.* **1.** 21.], draws attention to the undeserved prominence it received in the English poultry press, points out the lack of proof in Kerr's own paper and subjects the treatment to a more critical experimental test.

Sixty-two leghorn chicks (six weeks old) were placed on Kerr's iodine-milk treatment, with 51 controls on water. Both lots were then infected with oocysts strewn on bread. Mortality was practically the same in each group.

The author therefore considers the treatment to be valueless and attributes occasional apparent successes to simultaneous adoption of hygienic measures. He considers that no form of chemical treatment is satisfactory but maintains that coccidiosis is not difficult to control by proper hygiene. He favours the battery brooder.

[In Kerr's original paper the theoretical speculations under " chemical aspect of the investigation " are very weak. The most obvious probable reactions between hot milk and dilute iodine solution, involving conversion of iodine into inert iodide, are not considered].—H. H. Green.

I. Anderson, H. H. (1931). **Anthelmintic Properties of Certain Alkyl Resorcinols.**—*California & Western Med.* **35.** 138 and 144. [7 refs.]

II. Ohmes, H. (1932). Ueber die Wirkung einiger Wurmmittel beim Geflügel. [**The Action of Some Anthelmintics in Birds**].—*Arch. wiss. prakt. Tierhlk.* **64.** 469-483. 1 fig., 5 tables. [19 refs.]

I. This paper gives a brief account of the work on the action of hexyl- and heptylresorcinol in the removal of ascaris and hookworms. It is stated that the preliminary clinical reports indicate the superiority of these anthelmintics over carbon tetrachloride and oil of chenopodium.

II. By means of egg counts in the faeces of parasitized fowls, the author observed the effects of various anthelmintics upon heterakis and capillaria, but did not find anything which promised to be of value for the control of these parasites. Fowls were found to be particularly susceptible to the toxic properties of areca nut, but withstood comparatively large doses of carbon tetrachloride, tetrachlorethylene, corrosive sublimate, aniseed oil, kamala, turpentine and extract of male fern.—E. L. Taylor.

Freeborn, S. B., & Regan, W. M. (1932). **Fly Sprays for Dairy Cows—A Progress Report.**—*J. Econ. Entomol.* **25.** 167-174. 1 fig., 2 tables. [2 refs.]

Fly sprays of petroleum oils carrying pyrethrum or pine oil, or both, were tested by the authors for efficiency in keeping flies (house flies, horn flies and stable flies) from cows.

All the sprays tested had approximately the same efficiency for the first hour, but differed at subsequent intervals, pine oil increasing their efficiency in proportion to the amount applied. Burning followed the use of oils having a viscosity lower than 40 seconds, irrespective of the unsulphonated residue, while oils with unsulphonated residues below 90 per cent. were dangerous if used in oils with a viscosity higher than 65 seconds.

The matter of application was all important. With a careful, uniform application where the spray did not wet the skin, but hung in the hairs of the cow, a spray otherwise dangerous could be applied without injury.—J. S. Steward.

I. Wilkinson, J. F. (1932). **Activity of Commercial Preparations of Hog's Stomach.**—*Brit. Med. J.* Feb. 20th. 325-328. 1 table, 1 chart. [3 refs.]

II. —. (1932). **Biological Standardization.**—*Ibid.* Aug. 13th. 299-300. [3 refs.]

I. The author points out that the increasing replacement of liver by hog's stomach in the treatment of pernicious anaemia raises the question of biological standardization of commercial preparations. He examined 16 preparations in carefully controlled studies on human patients and found that although some produced excellent responses others gave entirely negative results. In general high peptic activity was associated with reliable preparations. He emphasizes the need for rigorous clinical control (blood picture, gastric juice) of treatment with commercial products.

II. A general article on the importance of biological standardization, mentioning the report of the League of Nations [see this *Bulletin.* **3.** 166.], the paper of Wilkinson [see I], Elvehjem's work on the influence of iron and copper on blood regeneration and the work of Maurer, Greengard and Kluver on the treatment of pernicious anaemia with liver extract combined with iron and traces of copper.—H. H. Green.

POISONS AND POISONING.

CORKILL, N. L. (1933). **An Inquiry into Snake-Bite in Iraq.**—*Ind. J. Med. Res.* **20.** 599-625 and 679-696. 5 plates, 3 tables, 1 map. [43 refs.]

The author has collected much information on the indigenous snakes of Irak and has noted 24 different species of which five have been found definitely poisonous for man. Cases of poisoning by them are described in detail. The article contains no information on snake-bite in domestic animals.—J. E.

CLAWSON, A. B. (1933). **The American Groundsels Species of Senecio as Stock Poisoning Plants.**—*Vet. Med.* **28.** 105-110. 5 figs. [6 refs.]

Various *Senecio* species (groundsel or ragwort) have been incriminated at various times as causing disease of stock—e.g. " pictou disease " of cattle in Canada, " winton disease " in New Zealand, " walking disease " of equines in Nebraska, and " dunsiekte " or enzootic liver disease in South Africa. A lengthy abstract of a paper on seneciosis by DE KOCK, DU TOIT & STEYN [see this *Bulletin.* **2.** 115.] has recently appeared and the main new matter of the present publication may, therefore, be presented as follows :—

(a) *S. integerrimus* is poisonous to cattle and horses but is not a serious danger because of its growth habits (present only when good grass is abundant) ;

(b) *S. longilobus* is one of the most poisonous species and is a source of danger to cattle, horses and sheep ;

(c) *S. spartioides* is added as a new species to the list now known to be toxic ;

(d) In general, development of liver disease is slow (weeks to months) and the total quantity of plant ingested is large (over the weight of the animal) but the behaviour of different species is very variable ; one group of horses survived 52 days and consumed a quarter of their own weight of *S. integerrimus* without becoming definitely ill, while with *S. longilobus* a steer was poisoned by a single feeding of 1 per cent. of its own weight, a horse by 2 per cent., and a sheep by 2·5 per cent.—H. H. GREEN.

LUMB, J. W. (1932). **Ergotism of Cattle in Kansas.**—*J. Amer. Vet. Med. Ass.* **81.** 812-816. 2 figs. [4 refs.]

This is a clinical account of an outbreak of ergotism in one herd of 27 cows and another of 16 yearlings. The cattle contracted the disease through eating prairie hay which had become contaminated by rye infected with ergot (*Claviceps purpurea*). Out of the herd of 27 cows, 11 were so emaciated that they were unable to stand and were killed. The remainder of the herd had all lost the tail switch and showed lesions in the hind legs ranging in severity from sloughing of the limb at the hock to tenderness in the fetlocks. In the herd of 16 yearlings, symptoms became manifest after one week's feeding with affected hay. Treatment consisted of an ergot-free diet and good feeding.

Mention is made of an extensive outbreak of ergotism in cattle in Kansas in 1884 and an epidemic in human beings in the United States in 1825. The control of ergot of rye is briefly touched upon.—EDWARD F. PECK.

KIELY, C. E., & RICH, M. L. (1932). **An Epidemic of Motor Neuritis in Cincinnati, Ohio, due to Drinking Adulterated Jamaica Ginger.**—*Publ. Health Rep. Washington.* **47.** 2039-2063. 3 figs. [13 refs.]

This epidemic was traced to the use of Jamaica ginger extract, which was widely consumed under the name of " jake " as an alcohol substitute in the United States. The injury appears to be associated invariably with the presence of

tri-orthocresyl phosphate possibly used as a denaturant. This compound was found to set up motor paralysis in dogs, cats, monkeys and chickens.

—G. D. Lander.

Klarenbeek, A. V., & Voet, J. (1932). Toxicologische proeven met triorthokresylphosphaat. [**Toxicological Tests with Tri-orthocresol Phosphate**].—*Tijdschr. Diergeneesk.* **59.** 1325-1332. 5 figs. on 1 plate. [9 refs.] [Summaries in English, French and German : abst. from orig.]

Tri-orthocresyl phosphate has been used in Holland as an adulterant of parsley extract and has been the cause of damage when used as an abortifacient. The symptoms of motor neuritis caused thereby have also been noted in America where the substance has been used as an adulterant to Jamaica ginger extract. The authors have tested the compound on fowls, dogs and cats. In fowls and dogs, after a latent period of 7 to 14 days, symptoms of motor paralysis recalling the syndrome observed in man are induced. The effects in the dog were produced by subcutaneous dosage at the rate of 300 mg. per kg. body weight and appeared after 16 days. A dose of 200 mg. per kg. failed to cause symptoms in a cat. [Compare Kiely & Rich—this *Bulletin.* **3.** 440].—G. D. Lander.

PHYSIOLOGY.

Godden, W., & Allcroft, W. M. (1932). **Changes in the Composition of Cow's Blood at the Time of Calving and a Comparison of the Blood of the Calf with that of its Dam.**—*Biochem. J.* **26.** 1640-1646. 1 fig., 1 table. [15 refs.]

The authors provide systematic data for 12 normal calvings, with respect to certain blood constituents of the cow for two days before parturition, and of cow and calf for seven days after.

The results showed a rise in blood sugar at calving followed by reduced sugar level for at least a week ; a fall in serum calcium about the time of parturition with return to normal within five days ; and a sharp fall in inorganic phosphorus just prior to calving, so distinctive that it could be taken as an invariable index of approaching labour.

The blood of the calf at birth showed higher levels of sugar, calcium, inorganic phosphorus and non-protein nitrogen, but a lower chloride content, than the blood of its dam.

[Compare various papers by Sjollema and Seekles, for variations in the normal cow as compared with cows suffering from grass tetany or milk fever. See this *Bulletin.* **3.** 91, 201 and 202].—H. H. Green.

Toverud, K. U., & Toverud, G. (1932). **Studies of the Mineral Metabolism during Pregnancy and Lactation II.**—*Biochem. J.* **26.** 1424-1434. 1 text fig., 3 figs. on 1 plate, 6 tables. [5 refs.]

A bitch was maintained in negative mineral balance on a ration providing only 14 to 17 mg. calcium and 37 to 40 mg. phosphorus per kg. body weight, but adequate in vitamin D.

Two superficially normal puppies were born, both of which were suckled for five weeks and then placed on the mother's ration except for vitamin D. This was supplied to one in the form of cod-liver oil, but not to the other. Both became bow-legged plantigrades and developed enlargement of the epiphyses and costochondral junctions. Clinical symptoms developed about the same time in each. Radiographs and bone analyses were finally made.

The authors consider that the lesions of the puppy receiving no cod-liver oil corresponded to rickets, but that those of the puppy receiving oil corresponded more closely to osteoporosis. Since vitamin D, in sufficient amount during foetal and suckling life, did not protect the bones from osteopathic changes when calcium and phosphorus were too low, the authors conclude that this vitamin has less influence on the calcium balance than on the intermediary distribution of calcium to the epiphyses of the long bones. [Compare views of HARRIS, this *Bulletin.* **3.** 203].—H. H. GREEN.

CASEY, A. E., & ROSAHN, P. D. (1932). **Studies on the Blood Cytology of the Rabbit. IX. Blood Platelet Counts on Healthy Male Rabbits.**—*J. Exp. Med.* **56.** 841-851. 4 tables, 1 chart. [16 refs.]

Blood platelet counts of the peripheral blood were made on 148 healthy male rabbits over a period of two and a half years. In all, 991 counts were made. All animals which became diseased during the course of the experiment were eliminated. The methods of statistical analysis indicated that no significant errors, due to various possible disturbing factors, occurred. " It was calculated that in healthy male rabbits a platelet count of less than 220,000 or more than 845,000 per c.c. should be considered abnormal."—GEORGE SLAVIN.

KRUMBHAAR, E. B. (1932). Les modifications apportées à la formule sanguine par l'ablation de la rate normale chez les mammifères. [**Changes in the Blood following Ablation of the Spleen of Mammals**].—*Le Sang.* **6.** 717-734. [111 refs.]

The author records his findings and reviews the literature on this subject. He states that the problem offers many difficulties. The spleen has no excretory canal and its function can only be judged negatively by removal ; the effects of such, however, are often masked because other tissues of the reticulo-endothelial system are able to compensate for its loss. The weight of the organ in proportion to body weight varies in different individuals of the same species and of different kinds.

Ablation gives rise to a benign and transitory anaemia which commences soon after the operation and reaches a maximum in a few weeks time. There is an increase in the number of reticulocytes and platelets and the fragility of the red blood cells is altered as evidenced by their increased resistance to hypotonic saline solutions.—D. R. WILSON.

BRANCHINI, B. (1932). Ueber Fehlerquellen bei der Blutdruckmessung am Pferde. [**Sources of Error in the Blood Pressure Measurements of Horses**].—*Arch. wiss. prakt. Tierhlk.* **64.** 350-361. 2 figs. [20 refs.]

In the past, several workers have recorded their findings in respect of the blood pressure measurements of horses affected with different diseases. Information was scanty, however, concerning the effects of physiological and psychological influences on the blood pressure measurements of healthy horses, and it was to this end that the present investigation, which extended to 15 horses, was directed.

The apparatus used was an improved model of PLESCH'S sphygmograph and the readings were taken at the coccygeal artery. The instrument consists of an elastic cuff which is applied to the tail and which is connected to a pen fed with an aniline dye, which in turn records the sphygmogram on a card disc with millimetre rulings. The instrument is said to record accurately the smallest oscillations in the blood pressure. The chief difficulties encountered in its application, but which were overcome, concerned the protection of the subject from external

stimuli, such as noises, flies, etc. which tended to cause excitement and to confuse the interpretation of physiological and psychological influences. The principal physiological conclusions arrived at were :—

(a) The state of nourishment and the rates of pulse and respiration have no appreciable influence on the blood pressure.

(b) Fatigue causes a clear drop in both maximum and minimum pressures, but the amplitude remains unchanged.

(c) Weather conditions and the time of day are without influence.

(d) Thoroughbreds have a slightly lower normal blood pressure than the heavier breeds of horses.

(e) Age is of significance only when considered in conjunction with breed. Thoroughbreds under seven years of age have a slightly lower pressure than older horses of that type.

It was found impossible to estimate the influence of psychological factors such as pain and fear.—A. A. Pryer.

I. Armstrong, A. R., & Walker, E. (1932). **The Bromine Reaction of Pregnancy Urine.**—*Biochem. J.* **26.** 143-146. [11 refs.]

II. Asdell, S. A., & Madsen, L. L. (1933). **The Biological Diagnosis of Pregnancy in Domestic Animals.**—*Cornell Vet.* **23.** 59-63. [10 refs.]

I. The substance in pregnancy urine which gives the positive Knoop's test is histidine, and nothing else. No other substance except N-methyl histidine has been found to give this reaction. No opinion is expressed as to the value of the test in the diagnosis of pregnancy.

II. The " placental sign " of pregnancy, which depends upon a leakage of erythrocytes between the maternal and the foetal placentae, is not found in the pregnant cow. The Zondek and the Friedmann tests are both negative in pregnant cows and goats. Using blood serum, the Friedmann test is positive in the mare from the 50th to the 100th day of pregnancy. A review of the literature is given. —Henry Dryerre.

Schlotthauer, C. F. (1932). **Observations on the Prostate Gland of the Dog.** —*J. Amer. Vet. Med. Ass.* **81.** 645-650. [14 refs.]

The prostate glands of 120 dogs were studied macroscopically and histologically. 40 per cent. were normal and 60 per cent. were pathological. Great variation was observed in the weights with no correlation to the body-weight. Adenomatous hypertrophy was observed in many showing cystic acini with high columnar epithelium and papilliferous ingrowths. Hypertrophy was common in old dogs and fibrosis was noted in six dogs, four of which had been castrated. The testes are apparently essential for the normal development of the prostate, castration arresting their growth. [There is no unanimity of opinion regarding the causation and the pathological nature of prostatic hypertrophy in man. Many authorities contend that the hypertrophy is a chronic inflammatory hyperplasia, many others that it is true neoplasia].—J. R. M. Innes.

I. Marie, A. C. (1932). Propriétés biologiques du liquide céphalorachidien. [**Biological Properties of Cerebrospinal Fluid**].—*C. R. Soc. Biol. Paris.* **109.** 838-839. [2 refs.]

II. Marie, A. C. (1932). De quelques Propriétés biologiques du Liquide céphalo-rachidien. [**Biological Properties of the Cerebrospinal Fluid**].—*Ann. Inst. Pasteur.* **49.** 429-434. 2 tables. [8 refs.]

III. Daniel, C., Crainicianu, A. L., & Mavrodin, D. (1932). Contributions

à l'étude des hormones du liquide céphalorachidien. [**The Hormones of the Cerebrospinal Fluid**].—*C. R. Soc. Biol. Paris.* **110.** 1139-1140. [2 refs.]

I. The following results are recorded from the addition of a few drops of cerebrospinal fluid to diluted tetanus toxin :—(a) the potency of the toxin is conserved in circumstances under which it is normally lost ; (b) the lethal effect of the toxin for mice is accelerated and (c) the potency of the toxin, if lost, is not restored by the addition of cerebrospinal fluid.

The conserving and accelerative powers of the cerebrospinal fluid are not impaired by filtration through a Chamberland L_3 filter or by heating at 67°C. for one hour.

Reasons for the exhibition of these phenomena are regarded as obscure, but may lie in the similarity of composition of the cerebrospinal fluid to that of the dialysable portion of blood serum.

II. This, as far as it refers to the conserving action of cerebrospinal fluid on tetanus toxin, is materially the same as I. In addition, it shows that the cerebrospinal fluid possesses similar properties when used in conjunction with the fixed virus of rabies. Possible reasons for this action of the cerebrospinal fluid are again discussed and whilst it is agreed that the pituitary hormones play some part in conserving the potency of the tetanus toxin, their extreme dilution (1 mg : 35 litres) makes it appear unlikely that they are solely responsible. Evidence is advanced which indicates that the albumen content of the cerebrospinal fluid may be an essential factor.

III. The authors conclude from their experiments, which consisted of observing the effects of subcutaneous injections of cerebrospinal fluid on the genital organs of rats, that the ovarian hormone, folliculine and the anterior pituitary hormone are absent from the cerebrospinal fluid. Attempts to demonstrate the presence of the posterior pituitary hormone by testing for its hypertensive and antidiuretic actions were inconclusive, but the findings of other workers which point to the fact that this is the only hormone present in cerebrospinal fluid are accepted.—A. A. Pryer.

Baetjer, Anna M. (1932). **The Effect of Muscular Fatigue upon Resistance.**—*Physiol. Rev.* **12.** 453-468. [51 refs.]

This is a summarized account of the results of other workers. The difficulties of adequately controlling these are stressed. The subject is considered from the following different standpoints :—(1) the effect of muscular exercise in animals upon resistance to infection experimentally produced. On the whole the evidence seems to support the view that several periods of severe muscular exercise *after* infection lower the resistance. If the exercise precedes the inoculation, the resistance is not altered ; (2) the effect of exhaustive muscular work in human beings upon the resistance to infective diseases. The results do not support the view that muscular work lowers resistance and (3) the effect of muscular fatigue on the defensive mechanisms of the body. After a strenuous march the Shick and the Dick tests become positive, returning to a negative reaction after rest.

The effects of fatigue upon the bactericidal power of the blood were conflicting. There is diminution in resistance to *Bact. typhosum* and *B. anthracis* in sheep and dogs after work of short duration, but there is increased resistance after work for a longer period. There is no evidence that fatigue diminishes the complement content of the blood. As regards the opsonic index, the evidence obtained is consistent. Severe muscular exercise gives a reduction in the opsonic content of the blood. This was exhibited in the rabbit, guinea pig and in human beings, the micro-organisms used being the *Streptococcus pyogenes*, the tubercle bacillus and

the typhoid bacillus. Muscular exercise produces marked increase in white blood corpuscles. The increase may be in the lymphocytes or neutrophils, or in both together, according to the nature and the extent of the exercise. It is suggested that the lessened resistance to inoculation followed by exercise, is caused by the latter increasing the blood and lymph flow and so spreading the infection more rapidly. Evidence supports the view that resistance is a function of the anabolic rate of the animal in the period following the infection. This is supported by the observation that starved guinea pigs inoculated with pneumococcus and fed immediately afterwards were more resistant than normally fed guinea pigs.

—Henry Dryerre.

Harris, L. J., & Ray, S. N. (1932). **Vitamin C and the Suprarenal Cortex. I. Antiscorbutic Activity of Ox Suprarenal.**—*Biochem. J.* **26.** 2067-2075. 2 figs., 3 tables. [25 refs.]

Zilva, S. S. (1932). **The Antiscorbutic Activity of the Cortex of the Suprarenal Gland of the Ox.**—*Ibid.* 2182. 1 fig. [1 ref.]

The activity of the cortex of ox suprarenals was measured by the curative test and the microscopic tooth structure test. It was found to be three times greater than that of standard orange juice. The suprarenal cortex from normal guinea pigs was equally potent, scorbutic guinea pigs had no vitamin C in the cortex. The titration values of the hexuronic acid content of orange juice and of suprarenal cortex were proportional to their antiscorbutic activity. This latter substance is the most potent natural source of vitamin C. It is considered that there is strong evidence to support the view that hexuronic acid and vitamin C are identical.

Zilva confirms that the cortex of ox suprarenal is more powerfully antiscorbutic than is decitrated lemon juice.—Henry Dryerre.

TECHNIQUE.

Ornstein, I. (1932). Influence de la température élevée de la stérilisation des tubes sur la contractilité du caillot et le rendement en sérum. **[The Effect of High Temperatures used in the Sterilization of Tubes on the Contraction of the Clot and the Yield of Serum].**—*C. R. Soc. Biol. Paris.* **109.** 899-901.

It has been observed that, when blood is drawn into tubes previously sterilized in a hot air oven at from 80° to 100°C. or in the autoclave at 120°C., the clot contracts normally and an average yield of serum is obtained. When the tubes are sterilized at from 180° to 200°C., however, the coagulum adheres firmly to the walls of the tubes and in most cases the serum does not separate spontaneously.

—R. E. Glover.

Gee, H. (1932). **Filtration Technique.**—*J. Bact.* **24.** 29-34. 1 fig.

The author describes a method of minimizing the dangers of contamination when filtering large quantities of liquid. Filtration is performed directly into litre pyrex flasks protected by a glass collar which carries a Berkefeld candle fitted with a mantle and an exit tube connected to a vacuum pump. After the flask has been filled, the whole of the filtering apparatus can be transferred to a second flask without risk of contamination.

The article should be consulted in the original for exact details.

—R. E. Glover.

I. Foot, N. C. (1932). **Two Simple Methods for the Silver Impregnation of Nerve Fibers in Paraffin Sections of the Central and Peripheral Nervous System.**—*Amer. J. Path.* **8.** 769-775. 4 figs. on 1 plate. [2 refs.]

II. Foot, N. C. (1932). **The Effect of Different Types of Fixation on the Silver Impregnation of Paraffin Sections of Peripheral Nerve.**—*Ibid.* 777-784. 4 figs. on 1 plate. [5 refs.]

III. Wilder, Helenor C. (1932). **Silver Impregnation of Glia and Nerve Fibers in Paraffin Sections after Formalin Fixation.**—*Ibid.* 785-788. 6 figs. on 1 plate. [9 refs.]

I. Tissues should be fixed not more than five hours after death.

Method A.—(1) Fix for 24 hours in a mixture of absolute alcohol six parts, chloroform three parts and glacial acetic acid one part. The acetic acid should be added when the fixative is required for use. Embed in the usual way after passing through absolute alcohol and chloroform. (2) Remove paraffin and xylol and leave section in mixture of pyridin two parts and glycerol one part for 1 to 12 hours. Wash well in 95 per cent. alcohol, followed by distilled water to remove the pyridin. (3) Place sections in 10 per cent. aqueous silver nitrate solution in the 37°C. incubator for 12 hours or longer. Wash in two changes of distilled water. (4) Develop for 20 minutes in 5 per cent. neutral formalin solution containing 0·5 per cent. pyrogallol. Wash in water. Fresh developer is required for each batch of slides. (5) Tone for five minutes in 1 : 500 aqueous gold chloride solution : 2 per cent. glacial acetic acid may be added to give enhanced nuclear precision. The solution may be used until most of the gold is removed. (6) Immerse for five minutes in 1 per cent. neutral formalin solution containing 2 per cent. oxalic acid. Wash well in water. (7) Fix for 5 minutes in 5 per cent. sodium thiosulphate solution, wash, dehydrate, clear in xylol and mount in Canada balsam.

Method B.—The tissues may be fixed in the fixative already described or in neutral formalin ; the latter gives the better results. (1) Remove paraffin and xylol and place sections in 95 per cent. alcohol containing 2 per cent. strong ammonia for 12 hours or longer. (2) Rinse in 80 per cent. alcohol, place in warm 40 per cent. silver nitrate solution in the 37°C. incubator and leave for 20 minutes. (3) Rinse in distilled water and cover with 20 per cent. neutral formalin solution. Leave for five minutes, then transfer to 5 per cent. neutral formalin solution. Remove from formalin, blot, cover with diammoniacal silver solution and leave for about one minute. (The silver solution is made by adding strong ammonia, drop by drop, to 20 c.c. of a 20 per cent. aqueous silver nitrate solution until the precipitate formed is just dissolved. Add a further 10 drops of strong ammonia and dilute by adding 20 c.c. of distilled water). (4) Blot and transfer to fresh 20 per cent. neutral formalin solution. Sections should remain in the formalin for five minutes or until they turn rusty brown. (5) Wash in distilled water and tone for 15 minutes in 1 : 300 aqueous gold chloride solution acidified with 2 per cent. glacial acetic acid.

The subsequent procedure is the same as in method A.

The hands and clothes must be adequately protected against the strong silver solutions.

II. Using human femoral nerve, removed not more than two hours after death, alcoholic, formalin, chromic and acid fixatives were tested.

A good fixative should extract the lipins and allow penetration of the silver without distortion of the tissue elements. The alcohol-chloroform-acetic acid mixture described in the previous paper gave the best results. Formalin causes great distortion of the nerve fibres and, in common with some of the other fixatives, brings out a great amount of what is probably spurious detail.

III. Fix tissues in 10 per cent. formalin, wash, dehydrate, clear in chloroform and embed in paraffin. (1) Remove paraffin and xylol and place in 34 per cent. hydrobromic acid for 30 minutes after rinsing in distilled water. (2) Wash in distilled water for 10 to 20 seconds, and flood the slide with 1 per cent. uranium nitrate (sodium-free) for five seconds or less. (3) Wash in distilled water for 10 to 20 seconds and place in the following solution for 20 seconds :—add ammonium hydroxide drop by drop to 5 c.c. of 10·2 per cent. silver nitrate solution until the precipitate formed just dissolves ; add 5 c.c. of 3·1 per cent. sodium hydroxide and just dissolve the precipitate with a few drops of ammonium hydroxide ; make the solution up to 50 c.c. with distilled water. (4) Wash in distilled water for two seconds, and agitate each slide separately in the following solution until it ceases to give off a brown cloud :—distilled water 50 c.c., 40 per cent. neutral formalin (neutralized with magnesium carbonate) 0·5 c.c., 1 per cent. uranium nitrate 1·5 c.c. (5) Wash in distilled water, counterstain with eosin, dehydrate, clear and mount in Canada balsam.

The impregnating and reducing solutions do not keep for more than a day or two.—George Slavin.

Kofoid, C. A., & McNeil, Ethel. (1932). **The Advantages of Locke's Blood Medium in the Culture of Parasitic Protozoa of the Digestive Tract.**—*Amer. J. Hyg.* **15.** 315-317. [4 refs.]

The medium used by the authors consists of 500 c.c. Locke's solution and 2·5 c.c. fresh defibrinated rabbit blood which is added to 4 eggs and 50 c.c. Locke's solution and inspissated at 15 lb. pressure for 30 minutes. A layer of nujol is sometimes added and helps to inhibit blastocystis.

In this medium the authors have maintained *Endamoeba histolytica* for six years, *Councilmania dissimilis* four years and *Trichomonas hominis* three years. They have also recently cultivated *Enteromonas* and *Trichomonas vaginalis*. They consider that the medium is very stable and suitable for prolonged cultivation, that other media may produce sudden flares, but that these are not conducive to continuance.—U. F. Richardson.

Claussen. (1932). Ein neuer Projektionsapparat für die Trichinenschau. [**A New Projection Apparatus for the Detection of Trichinae**].—*Berl. tierärztl. Wschr.* **48.** 714-715. 3 figs.

An apparatus for the detection of trichinae cysts in meat, recently brought out by the firm of Carl Zeiss, is well illustrated and described in detail. It has the great advantages over its predecessors of being small in size and readily portable ; it is also unnecessary to carry out the inspection in a darkened room.

The whole is incorporated in a metal box 80 cm. high by 52 cm. by 47 cm., the front of which is open. The pressed muscle preparation is placed on a small moveable stage and illuminated from below by a powerful electric bulb. The image which is thrown upwards on to a mirror fixed on the inner side of the top of the case is reflected downwards on to a white metal plate. The latter is placed obliquely in such a position that the operator can see every detail of the projection.

The magnification is such that the trichinae cysts appear between 2 and 2·5 cm. long.—N. S. Barron.

Hicks, E. P. (1932). **A Simple Apparatus for Breeding Fleas.**—*Ann. Trop. Med. & Parasitol.* **26.** 147-148. 1 fig., 1 table.

Flea larvae can be kept in a petri dish until about to pupate. When pupation approaches, the larvae are placed in a container with a cylinder of brown paper

round it; a slip of moist blotting paper can be inserted under the cork to maintain humidity. A glass tube passes through the cork and connects with a second container which is not shaded; as the adults emerge they make for the light. If the unshaded container is removed to collect the adults the brown paper cylinder should be removed from the breeding container so that any fleas hatching at the time will not be encouraged to wander.—U. F. RICHARDSON.

—. (1932). **Infra-Red Photography.**—*Brit. Med. J.* July 23rd. 159. [1 ref.]

This comprises a very brief survey of the various aspects of infra-red photography. The recent production of a new dye which is highly sensitive to the infra-red and heat rays lying beyond the red end of the visible spectrum, has provided a stimulus to the further development of this branch of photography and, although it has not as yet proved to be of any great practical value for medical purposes, it is suggested that infra-red sensitive plates may react differently to tissues in different states of health and disease.

Infra-red rays penetrate without difficulty a thickness of mist which would break up all visible beams of light and, whereas they are absorbed to a greater or less extent by different substances, they are reflected almost completely by chlorophyl.—N. S. BARRON.

OFFICIAL AND OTHER REPORTS.

SUDAN GOVERNMENT. (1933). **Annual Report of the Sudan Veterinary Service, 1932.** [KENNEDY, W.] pp. 42. [fcp.] [The report is mimeographed and not printed as in the past].

Notes on the staff are followed by the body of the report which is presented under four headings, namely, Diseases of Animals, Trade in Livestock and Livestock Products, Improvement of Livestock and Miscellaneous. The report of the Veterinary Research Officer is given as an appendix.

STAFF.

The financial situation has necessitated still further reductions. The establishment of Veterinary Inspectors which was reduced from 15 to 12 in 1931 has now been reduced to 10. The post of Assistant Director was abolished. Two lay European officials were also retrenched.

The Veterinary Police Force was reduced to a third of its strength at the beginning of the year and was finally abolished on December 31st. The force is being replaced by "Native Stock Inspectors" and many veterinary policemen have accepted employment as such. The training of "Tribal Retainers" continues.

DISEASES OF CATTLE.

CATTLE PLAGUE.—The disease was not so prevalent as in 1931. A warning is, however, given against assuming a false sense of security on this account, since the lower incidence is largely due merely to the temporary exhaustion of the supply of susceptible cattle.

Actually 503 outbreaks with 8,812 deaths were recorded as compared with 882 outbreaks and 16,812 deaths in 1931. (These figures refer only to outbreaks that came under veterinary supervision). 60 per cent. of the recorded mortality occurred in Darfur Province. It is pointed out that most of the serious outbreaks which occur in Kordofan and Darfur Provinces are traceable to contact with diseased cattle from the Bahr El Ghazal Province, where there is no veterinary staff.

For the first time the output of serum was sufficient not only to supply all demands from the field, but also to permit of a reserve being held.

Contagious Bovine Pleuro-Pneumonia.—Losses were approximately equal to those in 1931, but of 1,328 deaths recorded, 1,035 were in Darfur Province which, owing to shortage of staff, was without a Veterinary Inspector for nearly half the year. The only other area giving cause for anxiety was the southern portion of the Upper Nile Province; heavy mortality occurred here, but even an approximate estimate of the number of deaths could not be obtained.

Some 31,000 doses of (living virus culture) vaccine were issued, over 17,000 of which were used in the Upper Nile Province.

Foot and Mouth Disease.—An extensive area, including Fung, Blue Nile and Khartoum Provinces, became infected, but the disease had practically died out by the end of the year.

"The possibility of tracing the origin of outbreaks of this disease, or of controlling its spread, is rendered extremely remote by its mild nature which leads native cattle owners to regard its presence in their herds as of little or no importance. The outbreak in Khartoum Province involved the Belgravia Dairy herd and it was feared that the consequence might be serious since this herd is mainly composed of half-bred Friesians and Shorthorns. This fear proved, however, to be groundless as the disease pursued the same mild course in the dairy herd as it does in cattle of purely native blood."

Other Diseases.—A certain amount of trypanosomiasis occurred, but all in well-known infected areas. One outbreak of anthrax, involving two deaths, occurred and a single case of tuberculosis was diagnosed.

Diseases of Camels.—

"The practical value of the present methods of diagnosing and curing trypanosomiasis (diagnosis by the mercuric chloride test and treatment with a single dose of 4 g. of naganol) is well illustrated by the fact that since their adoption the losses reported . . . . in camels in Government service have fallen from an average of 40 per cent. to less than 8 per cent. of losses from all causes."

Large numbers of native owned camels have been treated. [A fee of slightly more than the cost price of the naganol is charged in such cases].

Diseases of Equines.

Horse sickness was of about normal incidence, the most heavily infected area being the irrigated portion of the Blue Nile Province. As usual, the mortality was much greater in imported than in native horses.

There were 70 cases of epizootic lymphangitis, including two primary pulmonary infections and a few cases of ulcerative cellulitis and trypanosomiasis (*T. congolense* and *T. brucei*).

Diseases of Dogs.

Thirteen cases of rabies were diagnosed, material coming from five provinces.

Trade in Livestock and Products.

The number of cattle and sheep exported constituted a new low record. The total value of exports was only £E. 14,763. Exports of camels were slightly lower than last year, 9,045 being sold.

Exports of hides and skins were the lowest on record, the market being so bad that only hides produced on the railway or river were worth the cost of transport. There was a slight increase in the export of clarified butter, totals being £E. 21,000. for 367 tons as compared with £E. 16,614 for 244 tons last year.

The demand for cattle for local slaughter continued to be poor.

Improvement of Livestock.

Castration of unsuitable bulls continued; one native retainer alone castrated over 2,000 in Kordofan Province with a bloodless castrator.

The Government dairy herd was sold to a local dairyman.

The expenditure on horse improvement was reduced by 50 per cent.

Some European fowls and ducks were imported by private individuals.

—S. C. J. Bennett.

Sudan Government. (1933). **Annual Report of the Veterinary Research Officer. 1932.** [Bennett, S. C. J.]—*Ann. Rep. Sudan. Vet. Serv. 1932.* pp. 24-42. [fcp.]

A general assessment is given in the summary :—

" The year has been characterised by an increase in all sections of routine work, except the examination of specimens which has remained at approximately the level of last year. . . . . The increases that have occurred in routine work have been considerable but not unexpectedly large. Coming, however, as they have done following upon repeated steady increases in earlier years, they have now placed the Research Section in a position in which further increases will overstrain both staff and accommodation."

The three main sections of the report concern staff, routine work and research.

Staff.

In addition to the Veterinary Research Officer the " classified " staff consisted of an assistant research officer, a laboratory assistant and a Sudanese clerk. The assistant research officer has now been permanently posted to the new serum laboratory at Malakal (500 miles South of Khartoum) and is never available for duty in Khartoum. During the Veterinary Research Officer's leave the laboratory was in charge of the laboratory assistant. When the latter was away the Veterinary Research Officer was unassisted and alone.

Routine Work.

The main routine duties (Khartoum and Malakal) were the preparation of cattle plague serum and pleuro-pneumonia vaccine, the issue of diagnostic outfits and naganol for the control of camel trypanosomiasis, examination of specimens and maintenance of the Department library.

Specimens.—The usual diagnoses were recorded, namely, various trypanosomiases and piroplasmoses, anaplasmosis, epizootic lymphangitis, spirochaetosis etc., the bulk of which are uninteresting. It is pointed out that these diagnoses are not representative of the incidence or distribution of disease in the Sudan, since the list only covers specimens sent to the laboratory, whereas most diagnosis is effected by field officers.

A few specimens are worthy of more than mere record. Two more cases of primary pulmonary *Cryptococcus* infection were seen, in one of which (the first on record) the bronchial glands were affected. A case of bovine tuberculosis was established (the first since 1925). The two most interesting specimens were of *Globidium* infection in horses and these are further considered in the section on research.

Control of Camel Trypanosomiasis.—The routine treatment (curative only) has consisted in the intravenous injection of a single dose of 4 g. of naganol. About 1,000 cases were treated and no relapses were recorded.

Cattle Plague Serum Production.—The present buildings at Malakal, which are not quite complete, were designed for a seasonal output of 3,000 litres (in a maximum working season of about seven months). During 1932 an attempt was made to produce 5,000 litres and 4,700 litres were actually prepared. Conditions generally were favourable, but considerable trouble was caused by many prospective virus producers proving immune. These were exchanged with native cattle owners for fresh ones, thus avoiding further expenditure.

Contagious Pleuro-Pneumonia Vaccine.—There was an increased demand, 31,200 doses (the highest total hitherto) being issued as compared with 23,580 in 1931.

Library.—This continues to grow. There is no library room, but books

are stored in two small non-adjacent rooms that are used for other work. All available space is now filled.

RESEARCH.

" The permanent posting of the Assistant Veterinary Research Officer to Malakal, and the slight, but nevertheless definite, increase in routine work in Khartoum, have kept the research programme within very rigid bounds."

CAMEL TRYPANOSOMIASIS.—The feature studied was the prophylactic value of naganol. It was found that naganol will protect camels against *T. soudanense*, the period of protection being proportional to the dose given. With a dose of 4 g., as is given in curative treatment, a healthy camel is not protected with certainty even for two months. With a 10 g. dose, as was formerly given for curative purposes, a healthy camel is probably protected for between four and six months. This is the same period for which camels cured with 10 g. have been found to be " immune," and it thus becomes evident that, in ordinary practice, immunity—in the strict immunological sense—is not observed, but the resistant period following cure is due to residual traces of naganol.

CATTLE PLAGUE.—The technique of serum production was studied at Malakal. The " routine " method of preparation is by maximal intramuscular hyperimmunization ; the features studied were maximal intra-rumenal hyperimmunization and the possibility of reducing the intensity of the intramuscular process by retaining the maximal doses of virus while lengthening the intervals between injections. The intra-rumenal process provided a very inferior serum and the less intense intramuscular process a serum that was fairly good but not so good as the " routine " serum. Studies on vaccine are proceeding (in Khartoum), but so slowly as to call for no progress report.

EPIZOOTIC LYMPHANGITIS.—A brief summary is given of a series of treatments with mercuric and potassium iodides in maximal doses, both *per os* and intravenously. The conclusions are that the treatment is of some use, but is of limited practicability under Sudan conditions. The two chief drawbacks are the length of time that treatment must be continued and the long period over which cryptococci continue to be shed even in cases which ultimately recover.

GLOBIDIUM INFECTIONS.—An account is given of studies that have been in progress for some years. A paper is already in the press. It seems that these infections may, in certain areas at any rate, constitute a veterinary problem of major importance.—S. C. J. BENNETT.

RAUTMANN, H. (1932). Bericht über die Tätigkeit des Bakteriologischen Instituts der Landwirtschaftskammer für die Prov. Sachsen zu Halle a S. 1931. **[Report on the Activities of the Bacteriological Institute of the Chamber of Agriculture for the Province of Saxony at Halle a. S. for 1931].** pp. 67. Halle : W. Kersten.

This Institute, on the staff of which there are nine professional workers and a total personnel of 78, does extensive work on a wide variety of veterinary state disease control, diagnosis and research. Its main activities during the year were in connection with the voluntary tuberculosis eradication scheme, in which over 32,000 herds of cattle were examined with the co-operation of 382 private veterinary practitioners, general diagnostical work and the combating of sterility in cattle.

TUBERCULOSIS.—Out of a total of over 800,000 cattle in Saxony, 218,000 were examined during the year. This represents about 50 per cent. of the breeding stock and just over 2 per cent. of these were eliminated under the control scheme as affected with open tuberculosis ; 90 per cent. were cases of pulmonary infection. Clinical examination with bacteriological testing of excretions formed the basis of

diagnosis ; animal inoculation was also employed largely in milk diagnosis. Milk sediment was found to be more useful than cream for the microscopic diagnosis of tuberculous milk. Microscopic sputum tests were employed to a large extent for the diagnosis of open pulmonary tuberculosis in cattle. Over 75 per cent. of farms engaged in the tuberculosis eradication scheme are now free of the disease, while there still remain over 6,000 infected farms.

A serious difficulty in connection with sputum guinea pig tests has arisen in that positive tests and also many positive microscopic tests of excretions are not confirmed by *post-mortem* examination of the bovine. Rautmann believes that there are strains of acid-fast bacteria that are symbiotic with cattle yet very virulent for guinea pigs.

Observations were made on the transmission of tuberculosis by copulation by a bull suffering from tuberculous orchitis ; in no case did it transmit a tuberculous metritis to eight cows served.

Experiments were also performed to test the contention of Truiss and Politowa [(1931). *Zlb. Bakt. I.* (*Orig.*). **120.** 408.] that actinomyces could be transformed into *Mycobacterium tuberculosis* by animal passage ; the results were negative.

This section of the report contains much valuable statistical information on bovine tuberculosis and its control.

Sterility.—Nearly 8,000 cattle were examined during the year ; the commonest pathological condition causing infertility is described as a slight uterine catarrh which was practically always curable. Enucleation of a corpus luteum was used successfully in a majority of cases of subnormal ovarian function.

Diagnostic Work.—This is carried out in two laboratories and the results of their work is given in tabular form, the more important being further discussed in the text. Of equine diseases, infectious anaemia became more widespread and evidence of the disease in foals was obtained. Contagious abortion in cattle was diagnosed by blood tests and the examination of foetuses. For isolation of the organism the department places the following in order of importance :—stomach, lungs, bone marrow, liver, and kidney, spleen and heart blood.

Further observations on the results of vaccination were made, the scheme formulated by the German Abortion Committee [see this *Bulletin*. **2.** 540.] being followed.

Amongst sheep diseases, abortion, mostly of non-bacterial origin, was encountered ; pregnancy disease was seen in two herds ; parturient gas oedema was observed and a bi-valent blackleg sero-vaccine was used against it. Mastitis due to *Bact. ovinum* (Dammann-Freese) or to micrococci was of less importance than in 1930. Borna disease was observed in 27 flocks and gave much trouble, but was controlled by the use of Zwick's fresh brain vaccine. The disease is described in some detail : diagnosis is confirmed by the finding of perivascular round-cell infiltration in the brain. Malignant oedema was found in a two weeks old lamb.

Streptococcal sepsis and a non-specific gastro-enteritis comprised the majority of cases of disease in young pigs.

Amongst cattle diseases, distomatosis was common and piroplasmosis was observed. A description of lead poisoning in calves is given. Information on diseases of dogs, cats, fur animals and fishes is also given.

Several pages are devoted to notes on poultry diseases, and some research work was also performed, notably on egg infection with the three types of *M. tuberculosis* with observations on the pathogenesis of the infection in chicks are described.

Milk Hygiene.—One department worked on diseases of the udder, both in the course of ordinary diagnosis and research and also in connection with the Reich Milk Law. In addition a new voluntary health control scheme was started, in which dairymen obtained free periodical examination of their cows and their milk on certain conditions. The scheme is described fully in the report.

The report is concluded by short sections on biological rat control preparations, an account of vaccines and sera issued, information on diseases of bees, on edibility tests of mushrooms, on the testing of various disinfectants (" mianin," a chlorine preparation, " bacillol " and " roh-chloramin "), a list of titles of lectures delivered by the staff and a list of papers published in veterinary and other periodicals.—J. E.

BOOK REVIEWS.

Duckham, A. N. [M.A.] (1932). **Animal Industry in the British Empire.**—pp. xvi + 239. 18 figs., 5 tables. [13 pages of refs.] Oxford : University Press. [8vo.] [15s.]

This summary of the development and present state of animal husbandry throughout the British Empire has been written for the purpose of providing information covering a wide field of observations, not easily accessible in concrete form.

Chapters are devoted to the discussion of the various problems concerned in relation to the British Isles, Canada and Newfoundland, Australia and New Zealand, and the Union of South Africa. An appendix includes a shorter survey of the position as met with in India and the Colonial Empire.

A foreword contributed by Dr. J. B. Orr, Director of the Rowett Research Institute, Aberdeen, draws attention to the vast claims of the agricultural and pastoral industries as affecting Empire trade, and the present dependence of the United Kingdom upon importations of animal products from overseas.

The author contrasts the methods adopted in the United Kingdom with those employed elsewhere and shows how climate, soil fertility, and distribution of population influence the results obtained due to the diverse conditions under which farming operations are conducted in various parts of the British Empire.

Referring to the pig and bacon industry of the British Isles, the author remarks that " Pig keeping, more than any other branch of English animal husbandry, suffers from indifferent management and disregard of market requirements." In marked contrast are the intensive methods, supported by the application of scientific research, in regard to poultry farming and egg production which has placed this industry upon a sounder basis than other branches of farming excepting, perhaps, liquid milk production.

The difficulties met with in Canada with its seasonal extremes of climate, low output per square mile settled and small turnover per unit of rural railway, which increase marketing costs and overhead charges, are discussed and suggestions for overcoming these obstacles to progress are made. Here again we find that the Canadian poultry industry is of greater importance than either pigs or beef. The importance of fur-farming in Canada also receives notice.

Problems relating to Australia and New Zealand are dealt with on a comparative basis. The dependence of Australia upon wool and of New Zealand upon meat export (mutton and lamb) and dairy produce are fully explained in a survey of these countries from the point of view of animal products.

The Union of South Africa also suffers disadvantages consequent upon low output per square mile and difficulties dependent upon transport of perishable

commodities. In addition, the prevalence of disease necessitates a constant war against tick and fly-borne infections. These drawbacks threaten the further development of South Africa's export trade. Interesting particulars are given of the native custom of regarding cattle as currency and a measure of wealth and social prestige, which at present renders the native owner averse to selling on the public market. Disease control is also evaded by the native with the natural consequences.

Chapters 8 and 9 are devoted respectively to " Mechanical Efficiency of Production," and " Problems of Animal Industry in the Dominion Empire." In Chapter 10 the author summarizes the relative potentialities of the various dominions with reference to the expansion of inter-imperial trade in animal produce.

Not the least valuable parts of this work are the statistical tables and an appendix of " Sources of Information " which conclude this comprehensive account of the British Empire's resources in regard to animal food and related products.

—H. A. Reid.

Newman, G. [K.C.B., M.D., F.R.C.P., Hon. D.C.L., LL.D., Chief Med. Officer, Ministry of Health]. (1932). **The Rise of Preventive Medicine.** pp. vi + 270. 8 plates, 2 tables. [168 refs.] London : Humphrey Milford. [8vo.] [10s. 6d.]

This book consists of ten Heath Clark Lectures delivered by the author in 1931 at the London School of Hygiene and Tropical Medicine. A wide range in the development of preventive medicine is covered, from the time of folk-lore and magic, the laws of Egypt and Greece, and the origin of medical science in England down to the present time. The lectures upon the rise of physiology and advances in pathology and bacteriology are of particular interest and might be read with advantage by all embarking upon a research career and lead to curtailment of much that is now published as new knowledge.

The author quotes Bullock showing that, as far back as 1876, " Koch's anthrax research was born complete, and no substantial changes have since been made in it." An outline of the work of Koch and Pasteur is given, the latter of whom as a professor of chemistry, carried out such epoch-making researches on anthrax, rabies and swine erysipelas vaccination. No less interesting is the account of progress in tropical medicine in which the history of the part played by blood-sucking insects is given. The reader cannot but be struck by the fact that all the discoveries of the great pioneers met with considerable opposition. Long after Pasteur had shown the fallacy of spontaneous generation, this theory was still strenuously advanced by some, leading Pasteur to exclaim at an international congress in London " My God ! Are we still at that stage ? It is impossible." Lister's work on the prevention of sepsis in surgical wounds was not accepted at first.

The chapter on the development of a public health service has much of interest for the veterinarian who ponders on whither present developments in the prevention of animal diseases are leading. The " scenes of filth, discomfort and disease " amongst the poorer classes of human beings led to the creation of a Board of Health in 1849. Similar scenes amongst animals are all too common today. It is worthy of note that the first Board of Health was without a medical member for a period of two years !

The author says " I have little doubt that the extension of education is at the root of much of the national health development."—S. H. Gaiger.

Plimmer, R. H. A., & Plimmer, Violet G. (1932). **Food, Health, Vitamins.**

pp. xii + 143. 12 figs., 30 tables. [8 refs.] London : Longmans, Green & Co. 5th Edition. [8vo.] [3s. 6d.]

This little book is a revised version of the authors' earlier " Food and Health " which was itself an expansion of lectures prepared for the People's League of Health. Its genesis indicates the public for which it is written and its popularity is indicated by the fact that the present edition is the fifth since 1925. But although it is written in language as simple as the subject permits it covers a surprisingly wide field and includes most of the new discoveries up to the date of its publication (e.g. the chemical nature of vitamin C and the work of STRAUSS and CASTLE on the anti-anaemic factor of the liver). It should, therefore, appeal to the busy general practitioner and to professional nurses as well as to the lay public.

Although the greater part of the space is devoted to qualitative factors the second chapter is devoted to the " square meal " and the last chapter includes tables on the percentage composition of common foods, together with short explanations of calorie values and quantitative energy output.—H. H. GREEN.

SIMON, M. St. L. (1932). **Diagrams and Sketches of Some Insect Vectors and Other Arthropoda Injurious to Man and Beast.** 8 folding plates. London : Garrett & Campbell Ltd. [Second Edition.] [4to.] [4s.]

One plate is devoted to a diagram of the classification of the arthropoda and the remaining eight plates are filled with sketches showing the chief characteristics of the genera.

Plates I to III cover the Diptera and show the wing venation, adults and larvae of each genus, with additional diagrams of generic or specific importance. Plates IV to VI illustrate the adults of the genera of Siphonaptera, Anoplura and Hemiptera respectively. Plates VII and VIII similarly show the natural order Acarina with, however, the notable omission of all reference to the Sarcoptidae and Demodecidae.

The book has been compiled to avoid voluminous note-taking by students, who are advised to annotate and amend the sketches to emphasize the important features. It undoubtedly serves its purpose in facilitating the rapid and easy comparison of the characteristics of the different genera and it is good value for the price asked.—J. S. STEWARD.

STEMPELL, W. [Professor of Zoology, Comparative Anatomy and Comparative Physiology, at Wilhelms University. Münster, Westphalia]. (1932). Die unsichtbare Strahlung der Lebewesen. (Mitogenetische oder Organismenstrahlung). **[Invisible Radiations of the Living Organism. (Mitogenetic Radiations)].** pp. 108. 57 figs., 3 tables. [13 pages of refs.] Jena : Gustav Fischer. [8vo.] [RM. 7.5]

The subject matter of this monograph is novel and phrases such as the " Gurwitsch phenomenon " and the " Rajewsky effect " are not yet amongst the commonplaces of biological literature. Relatively little has been published in English on the so-called " mitogenetic radiations " and their very existence is still regarded as controversial in some quarters. Yet for the year 1931 alone the author provides about 80 references, mostly to literature published in the German language, although many papers are of Russian origin.

The term " mitogenetic radiation " was introduced by GURWITSCH in 1923, to denote a stimulus to cell division in " detector cells " exercised at a distance by " transmitter cells " credited with emitting radiations of the short wave ultraviolet type. In the original experiment onion roots (*Allium cepa*) served both as transmitter and as detector, the tip of a growing root inducing mitosis in the division

zone of a root placed at right angles a short distance away. The stimulus travelled in straight lines and could pass through quartz crystal but not through glass.

Later work provided a long list of organisms and tissues capable of acting as transmitters or " inductors " and the author goes so far as to say that all living objects, and many of their products, emit radiations although the intensity and quality of these may vary widely. Suitable detectors are also numerous—including yeast cells, bacterial cultures, plant roots, tissue cultures, sea-urchin eggs, etc.

The metabolism experiments of GESENIUS are quoted as showing the influence of an agar culture of yeast as inductor, upon the rate of fermentation of a neighbouring fluid culture as detector. The " Stempell effect " utilizes the Liesegang ring phenomena to demonstrate the influence of the radiations. The " Rajewsky effect " utilizes a purely physical detector (photo-electric) for detecting the radiations and for measuring their very feeble intensity.

The author discusses manner of origin, wave-lengths, intensities and mode of action, for details of which the original work must be consulted.—H. H. GREEN.

RICHTERS, C. E. [Prof. Dr. med. vet.] (1932). Die Tiere im chemischen Kriege. [**Animals in Chemical Warfare**]. pp. 141. 40 figs., 5 coloured plates. [102 refs.] Berlin : R. Schoetz. [8vo.] [RM. 11.40]

According to the author, during the course of the war some 50 chemical substances were used in so-called " gas war," but at the end only some dozen were in use. From the point of view of their action on the organism, gases are classified as :—(1) irritant, acting on the eye, nose and throat, (" bluecross ") ; (2) suffocating, (" greencross ") ; (3) corrosive, (" yellowcross ") and (4) various dangerous substances.

" Bluecross " comprises aromatic and aliphatic arsine chlorides and cyanides (Clark I & II, " adamsit," Dick). These substances, for the most part solids of high melting point, atomized by gas bombs, lead rapidly to irritation of the mucosae with profuse discharge from the eyes and nose. Finer particles in large proportion lead to acute inflammation of the respiratory tract with its sequelae.

" Greencross " comprises the well-known phosgene (" collingite ") trichlormethyl chlorformate (" perstoff," " diphosgen," " surpalite," " superpalite," " chlorpicrin " (Klopp, " greencross 1 ") ; chlorine, nitrous fumes and organic halogen compounds, such as bromacetone (B-stoff) and chlormethyl chlorformate ("palite"). Their action is illustrated by phosgene, the main effect of which is the production, after a latent period which may last from 6 to 12 hours, of rapid shallow respiration and attacks of suffocation.

" Yellowcross " comprises chlorethyl sulphide (" yellowcross," " los," " yperite," (mustard-gas) and chlorvinyl dichlorarsine (" lewisite "), whose action is typically corrosive.

The author gives full descriptions of the pathology and treatment of cases of these poisonings, and sections of the work are also devoted to gas-mask protection, the measures necessary to purify water and foodstuffs, and to clear stables, and buildings of gas.

Experiences of the effects of " gas " in war were not so numerous on the German as on the allied side for the initiative lay with the former, and it was not until towards the end of the war that " mustard-gas " was directed against them.

Scientific readers will agree with the author that there is no all-destroying agent, each having its own definite limits of effectiveness.

This book gives a full and accurate survey of our knowledge of this branch of veterinary toxicology.—G. D. LANDER.